# Modular finite-state machine analysis

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#### Abstract

Physical systems can be modelled as a system of finite state automata running in parallel. When a system is represented in this way it can be verified whether or not the given system conforms to given specifications by composing the synchronous product of the system[17]. However composing the synchronous product requires time and memory which is exponential in the number of automata in the system thus making it impractical for more complicated system. One of the methods for getting around this is the modular technique of controllability checking[3], but unfortunately this is also subject to in the worst case requiring time and memory which is exponential in the number of automata in the system. This project has developed new techniques for checking the controllability of systems which have even made it possible to check the controllability of a system which had previously been unsolved.

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# Chapter 1 Introduction

In industry it is frequently required to be able to verify that within a system such as a factory, certain states are unreachable (for example for the system of an elevator it might be useful to verify that it is impossible for the doors on the first floor to open when the elevator is currently on a different floor). These states can be referred to as "Bad States". Reasons for confirming that these "Bad States" are unreachable can range from loss of money to possible loss of life. Physical systems can be modelled as a set of Finite State Automata running in parallel. Once modelled in this form whether or not it is possible for the system to reach any "Bad State" can be checked by generating the synchronous product of the entire set of automata [17]. Unfortunately, this has the drawback that generating the synchronous product of a system takes time proportional to the number of reachable states in the composed system, which in turn grows exponentially with the number of automata in the system. For more complicated models this can be more states than could be realistically processed. Several methods to combat this have been developed. All of these methods seem to be superior for certain systems but inferior for others.

One of these is the modular method [3]. This method has shown great promise when verifying certain extremely large models. It is for this reason that we chose to investigate this method in this project. In this project we have managed to implement the modular method of controllability checking as well to design and implement several variants of this approach. In addition to this, we have designed a method of automatically simplifying models such that they may have orders of magnitude less reachable states. Yet it can be provably shown that there will exist at least one "Bad State" in this simplified model, if and only if there exists a "Bad State" in the original model. To do this we designed and implemented a method of transforming the original model into a new model which is equivalent in terms of the behaviour we are verifying [7], as well as a method for continuously using projection [17, 9] to simplify this model. Also if a "Bad State" is found in the simplified model we have also designed and implemented a method for translating the cause of a "Bad State" in the simplified model to its cause in the original model. This method has been developed to be used in conjunction with the modular method. It has however shown promise when used independently of it. All of these checkers have been integrated into the WATERS toolkit and have been tested on a large set of models of varying sizes, some of them extremely large.

This thesis is be composed of the following chapters.

In Chapter 2 we discuss some of the underlying theory required to understand this thesis. In Chapter 3 we discuss the modular checker implemented in this paper and how it compares original implemented in Valid [3]. In Chapter 4 we discuss the a variant of the Modular Checker called the Parallel Checker and how well it works. In Chapter 5 we discuss another variant of the Modular Checker called the Culling Checker and how well it works. In Chapter 6 we discuss various algorithms for using projection in model checker. In Chapter 7 we discusses related work.

# Chapter 2

# Preliminaries

To make the contents of the rest of this report more readily understandable, it is useful to give definitions for some of the more important terms.

#### 2.1 Languages

Languages are made up of an alphabet and words. The alphabet of a language is the set of symbols which can possibly occur within that language's words. A word is a sequence of symbols. A language contains a set of words.

When expressing a discrete event system as a language the alphabet of the language is the set of all events which can possibly occur in the system. The set of words of the language is the set of all possible sequences of events which could possibly occur in that system. A sequence of events can also be referred to as a trace through the system.

### 2.2 Automata

Figure 2.1 shows an example of an automaton. This example consists of circles called states and arrows between states called transitions. Each state has a label associated with it representing its state name. Likewise each transition has a label associated with it representing the event required to travel along that edge. Transitions can be written as  $p \xrightarrow{\alpha} q$  where p is the source state,  $\alpha$  is the event, and q is the target state. In addition, we can see that the state S0 has an arrow pointing to it from nowhere. This marks it as the initial state of the automaton.

Now that it has been explained what makes up an automaton it can be explained how an automaton can be used to represent a language. An automaton will accept a trace  $\sigma_1 \ldots \sigma_n$  if and only if there exists a sequence of transitions  $p_1 \xrightarrow{\alpha_1} q_1, \ldots, p_n \xrightarrow{\alpha_n} q_n$  through the automaton which fulfils the following requirements.

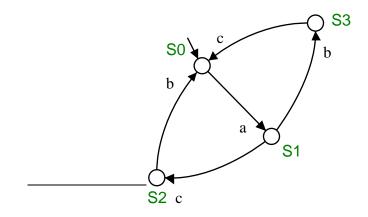


Figure 2.1: An example automaton

1. For each transition the event labelled on it matches the corresponding event in the trace.

$$\forall i \in 1..n; \sigma_i = \alpha_i$$

2. The source state of each transition matches the target state of the previous transition.

$$\forall i \in 1..n - 1; q_i = p_{i+1}$$

3. In the case of the first transition, its source state must be in the set of initial states.

From this we can define the language L(A) of the automaton A to be equal to the set all the event sequences which the automaton accepts. Here are two example traces for the automaton given in figure 2.1.

1. For the trace abcacba the automaton would have the possible sequence of transitions

$$S0 \xrightarrow{a} S1 \xrightarrow{b} S3 \xrightarrow{c} S0 \xrightarrow{a} S1 \xrightarrow{c} S2 \xrightarrow{b} S0 \xrightarrow{a} S1$$

2. Whereas for the sequence *abbcacba* would only have a trace up to

$$S0 \xrightarrow{a} S1 \xrightarrow{b} S3$$

and the automaton would reject the trace.

For the automaton given, none of the states have been marked as accepting states, because for the purpose of this report it is good enough to consider all states as accepting.

#### 2.3 Running in Parallel

When modelling discrete event systems they are generally represented as a set of automata running in parallel. This is because designing just one automaton representing the entirety of a system is impractical due to the complexity of most system's.

When automata run in parallel they essentially all run at the same time. This means that the system can only receive those events which are allowed to occur in the current state of each automaton and that the state of each automaton is updated concurrently. It should also be noted that for every automaton, there is implicitly a selfloop for every event not contained in the alphabet of that automaton on every state in the automaton. Selfloops are transitions for which both the source and target state are the same.

If we have a set of automata running in parallel we can build an automaton which represents the language of the entire system running in parallel. This is called the synchronous product of the system.

Figure 2.2 is an example of a factory with two machines [17] called small factory. Both machines start in the Idle state (I) and can enter a Running state (R) by receiving a start event (s1 or s2). Then when they are Running they can either receive a finish event (f1 or f2) meaning that they have finished doing their job and return to the Idle state (I), or they can receive a break event (b1,b2) which causes the automaton to break down and enter the Broken state (B), in which they can be repaired(r1,r2) and return to the Idle state (I). In addition to this there is a buffer between the two machines. This buffer starts out as being Empty (E) but when Machine1 finishes (f1) it takes the product from Machine1 and becomes Full (F). Then when Full (F), if Machine2 starts (s1), it takes the product and works on it making the buffer Empty (E) again.

Figure 2.3 is the synchronous product of Figure 2.2. When looking at the state labels of this automaton we can see that they contain three names separated by commas. The significance of these three names is that the first name corresponds to the state of machine1 the second state corresponds to the state of the buffer and the third name corresponds to the state of machine2. Thus, if this automaton is in the state R,F,I then machine1 is Running (R), Machine2 is Idle (I) and the buffer is Full (F). From the diagram, it is possible to see that machine1 cannot finish when the buffer is Full (F) and machine2 cannot start when the buffer is Empty (E). Also when looking at figure 2.3, we can see that even a simple system such as small factory produces a rather complex and messy synchronous product.

#### 2.4 Language Inclusion

Language inclusion can be used to check to see if the language of a system is more restrictive than the language of a given automaton. Such an automaton is called a property or requirement. We say that a set of automata A satisfies a requirement R if and only if every trace t which is in the language of A is also

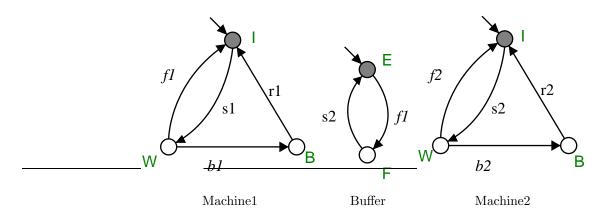


Figure 2.2: Small factory

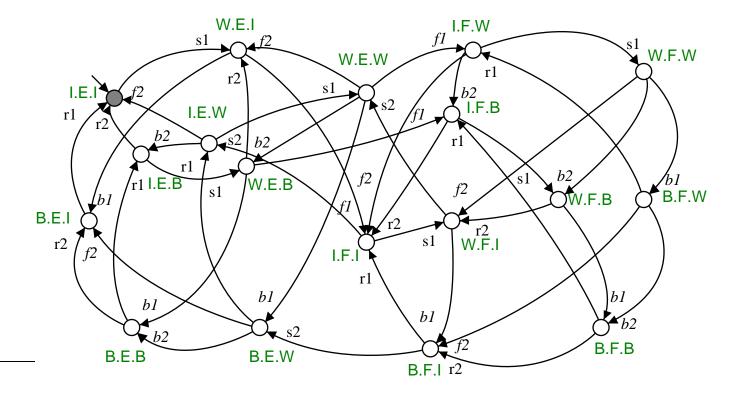


Figure 2.3: Synchronous product of small factory

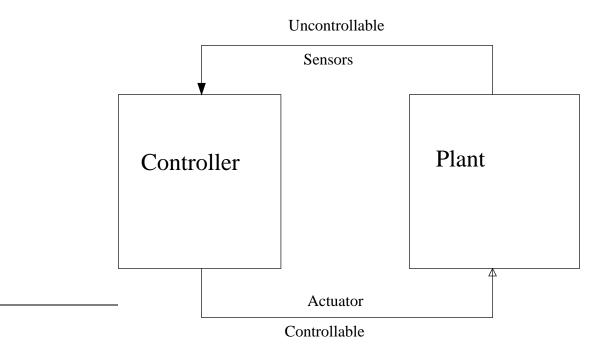


Figure 2.4: Figure of Controllability

in the language of R [1].

 $\forall t: t \in L(A) \to t \in L(R)$ 

The standard algorithm for checking if a set of automata A satisfies the requirement R is to construct the synchronous product A and R and then to check to see that for all states in the synchronous product that whenever all the automata in A allows a given event to occur R will also allow that event to occur.

This is useful because it can often be easier to define aspects of high-level system behaviour in a property without having to talk about low-level aspects of the system, and then check to see that the actual system which has to deal with the low-level details still conforms to this.

## 2.5 Controllability Checking

For controllability a system can be divided up into a controller and a plant. The controller is capable of sending controllable events to the plant telling the plant what to do, whereas the plant is capable of sending uncontrollable events back to the controller telling the controller what has happened to it. This relationship is shown in figure 2.4.

Automata are defined as being either plants which are part of the Plant, or controllers which are part of the Controller.

The language of the Plant is the intersection of the languages of all the plants in the system and represents all the possible sequences of events the Plant could go through.

The language of the Controller is likewise the intersection of the languages of all the controllers in the system and represents all the sequences of events the Controller would allow the system to go through.

From this we define a Plant P as being controllable with respect to a Controller C, if and only if, there exists no trace t for which, if it had an uncontrollable event v appended to it's end, it would be accepted by the language of the plant but not the controller.

$$\forall t, \upsilon : t\upsilon \in L(P) \land t \in L(C) \to t\upsilon \in L(C)$$

The standard algorithm for checking for controllability in a system is similar to that of checking language inclusion. We simply to construct the synchronous product of the system and check that in every state of the system that whenever all the plants in P allows a given uncontrollable event to occur all the automata in C also allow that uncontrollable event to occur [17]. This approach to controllability is called the **Monolithic** approach.

Now we can revisit the example automaton given in Figure 2.2 where we now state that machine1 and machine2 are both plants as they represents how the system behaves. Buffer however is a specification as it has no control over when machine1 and machine2 stop. We further go on to state that starting and repairing a machine are both controllable, whereas a machine finishing or breaking is uncontrollable. A machine finishing is said to be uncontrollable as once the process starts there is no way to delay the process finishing. The item produced in the process must be removed from the machine as soon as it finishes lest either the machine or the object be damaged. Now if we look at the synchronous product of this system given in Figure 2.3 we can see that machine1 and machine2 are not in fact controllable with respect to buffer, as in the state Running,Full,Idle, the buffer would not allow the uncontrollable event of machine1 finishing (f1) to occur whereas both machine1 and machine2 would.

The small factory example can be made controllable by replacing its buffer controller by the one given in Figure 2.5 as can be seen by the fact that there is no state in the synchronous product of this new system given in figure 2.6, where machine1 is never allowed to finish when the buffer would not allow it to.

It should also be noted that the Language Inclusion problem referred to in the previous section can be converted into a Controllability problem simply by stating that all specifications are plants, all properties are specifications, and all events are uncontrollable [1].

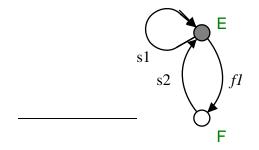


Figure 2.5: Modified buffer

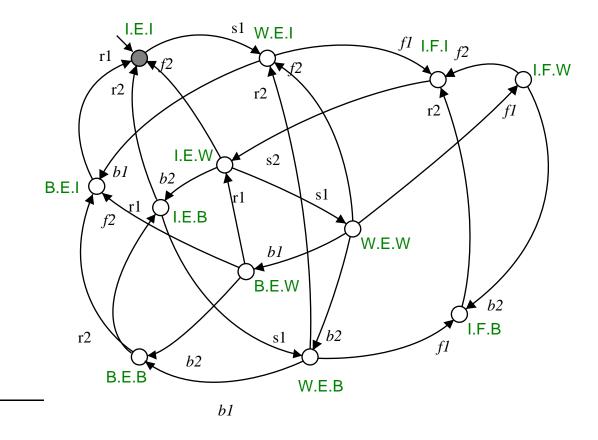


Figure 2.6: Synchronous product of Small factory with modified buffer

# Chapter 3 Modular Checker

The monolithic method of checking controllability in a system has the major drawback that the construction of the synchronous product of a system takes time which is exponentially proportional to the number of automata in the system, this makes it unfeasible to use on larger systems.

The method of modular controllability checking [3] attempts to solve the problem of verifying controllability, in less time. It does this by exploiting the fact that the synchronous product of a system is the intersection of all languages in the system. Thus if a subset of the automata in the system do not contain a trace which is a counterexample for a given controller, then the entire system must not contain a counterexample for the given controller, as adding extra automata to the synchronous product will not add any new traces to the synchronous product. Therefore, it is possible in many instances to prove a specification without having to compose the entire system of automata.

## 3.1 Algorithm

The modular checker described in [3] was implemented in the WATERS framework. The algorithm is detailed in Figure 3.1. We pick a controller to prove controllable with respect to the plant. Then we use a controllability checker to find a counterexample for the controller. Then we pick a plant or controller which doesn't permit said counterexample, and add it to the composition with the original controller, then repeat the process by checking the controllability of the system with the extra automaton. This process course end under one of two conditions first, we may come to a situation where we find a counterexample which no plants or controllers in the system are capable of rejecting, in which case the counterexample must be a counterexample for the model as a whole, and as such the model is not controllable. Alternatively, we may come to a point where the controllability checker finds no counterexample for the composition, in which case we know that there is in fact no counterexample for the controllers currently in the composition [3], and we can now treat them as C equals the set of Controller automata in the model and P the set of Plant automata, and S is the set of automata composed so far.

- 1. Set the set S as being empty.
- 2. If C is empty the model has been proven controllable; otherwise take an automaton from the set C and add it to S.
- 3. Check controllability of S using the monolithic method. Consider automata which are elements of C as controllers and automata which are elements of P as plants.
- 4. If no counterexample for S was found go to 7. Otherwise set t to be the counterexample found by the controllability check.
- 5. Set the set N to contain all automata in P and C which do not accept the counterexample t. Take into consideration for all automata in C that specifications in addition to not accepting t, must also not consider t as being a counterexample to their controller.
- 6. If N is empty, then the model has been proven not controllable and t represents a counterexample in the system. Otherwise, pick a subset of N to add to S, then go to 3.
- 7. For all elements of S, if they are also an element of C, remove them from C and add them to P. Then go to 1.

Figure 3.1: Modular Controllability checking algorithm

plants (as we have proven that under no circumstances can an uncontrollable event occur when the controller would not allow it). At this point we go on to prove any controllers which have yet to be proven in the same way as above. Once all controllers have been proven, we can say that the model is controllable.

If we look at the algorithm for modular controllability checking in Figure 3.1, it can be noticed that for both steps 1 and 6, it has not been adequately specified just exactly which automata to pick at each of these steps. This is because for both of these steps there is more than one way of choosing these automata, and which one is best can be different for any given model. Firstly for step 1 there are two ways of selecting which specification to prove. The first is to use the comparator described in Figure 3.2 to find the smallest specification in S and to use that one, The rationale is that it will most likely be easier to prove the smallest specifications first, and once proved they can be treated as plant automata, thus helping to prove all subsequent specifications. The second is to compare all the specifications in exactly the same manner as above, but instead of taking the smallest to take the largest, hoping that either largest is either more likely to have a counterexample, or that, when proven, it will be more helpful as a plant for the purpose of proving subsequent specifications.

Then for step 6, there are many heuristics which can be used to choose an automaton to add to the composition. The heuristics are as follows.

**All** add all automata in N into C.

- **EarlyNotAccept** Add the automaton in N which rejected t the after the fewest number of steps through t.
- **LateNotAccept** Add the automaton in N which rejected t the after the greatest number of steps through t.
- **MaxCommonEvents** Add the automaton in N which has the maximum number of events in common with C.
- **MaxCommonUncontrollable** Add the automaton in N which has the maximum number of Uncontrollable events in common with C.
- **MaxStates** Add the automaton in N which has the largest number of states.
- **MinEvents** Add the automaton in N which has the smallest number of events.
- **MinNewEvents** Add the automaton in N which has the smallest number of events which are not currently contained in C.
- MinStates Add the automaton in N which has the smallest number of states.
- **MinTransitions** Add the automaton in N which has the smallest number of Transitions.
- **One** Arbitrarily take the first automaton found in N.
- **RelMaxCommonEvents** Add the automaton in N which has the highest proportion of its events in contained in C.

In addition each of these heuristics can be run in two modes. They can either consider all automata as being equal or they can consider plant automata as being superior to controller automata thus always choosing a plant automata over a controller automata if at all possible. The reasoning behind this is that whenever we add in an extra controller automaton to the composition we also add in new possible counterexamples which must be ruled out.

### 3.2 Results

This section contains tables of results for both the original modular controllability checker implemented in Valid [3], as well as the results for the checker implemented in WATERS. The results from Valid show the total number of states which had to be explored, whereas for the new implementation the number of seconds required to solve the model is also shown. For all cases, when the model checker was run it was set up so that whenever the model checker attempted to construct the synchronous product of a set of automata and the The first automaton is  $A_1$  and the second automata  $A_2$ .

- 1. If  $A_1$  has more states than  $A_2$ , then  $A_1$  is bigger.
- 2. If both  $A_1$  and  $A_2$  have the same number of states then, if  $A_1$  has more transitions than  $A_2$ ,  $A_1$  is bigger.
- 3. If both  $A_1$  and  $A_2$  have the same number of transitions then, if  $A_1$  has more events than  $A_2$ ,  $A_1$  is bigger.
- 4. If both  $A_1$  and  $A_2$  have the same number of events then, if  $A_1$  has a bigger name than  $A_2$ ,  $A_1$  is bigger.

Figure 3.2: Comparator for automata

number of states which it has explored in that synchronous product becomes greater than two million states, then the model checker stops to prevent itself from running out of memory, in which case there will be a blank entry in the table where the number of states should be.

Here follows a description of the models used for testing.

- big\_cmft\_kl50, big\_fh\_cmftreq1, big\_manual\_cmft, bigcmft\_reg, big\_fh\_cmftreq0, big\_bmw are models describing the BMW E65 CAS window lift controller [6, 13].
- fzelle, ftechnik, ftechnik-nocoll, represent a case study of a production cell [11, 12].
- models beginning with profisafe represent the PROFIsafe field bus protocol [14, 15, 16].
- rhone\_alps, rhone\_tough, represent an AIP automated manufacturing system [2, 4, 10].
- tbed\_uncont, tbed\_nocoll, tbed\_noderail, tbed\_ctct, tbed\_valid, represent a train testbed [10].
- verriegel4\_vrprop, verriegel4\_erprop, verriegel4, represent a central locking system.

All of these models represent real world systems and have state spaces which are to large to be explored by a monolithic controllability checker.

It can be seen between the two sets of tables, there can be in some cases quite marked differences in results between the two implementations. This can most likely be put down to the fact that both implementations use different methods of choosing which specification to prove first, both have different methods to break ties when a heuristic considers two automata equally desirable, and it is quite possible that in some cases the specific counterexample found at each iteration by either method could be different.

If we look at the differences in states required for any particular heuristic to solve a problem it can be seen that, for most heuristics, their performance is in fact comparable with the one heuristic. This is to say the performance of most heuristics is in fact comparable to just arbitrarily picking an automaton to add to the composition. The notable exceptions to this are MaxCommonEvents. MaxCommonUncontrollable, and RelMaxCommonEvents which have the capability of solving the controllable models in the thed series of problems when having no preference for plants. From the test data it looks like MaxCommon-Events is the best bet for solving most problems as it shows the most consistency in requiring to look through a low number of states. Also when we look at the difference in performance in heuristics when comparing a preference for plants to no preference, we can see that for most models a preference for plants seems to give mildly better results, whereas for the tbed series of models no preference works a lot better. Finally, when we look at the difference between checking the larger specifications first or the smaller, it seems that with the exception of big\_bmw for most models the strategy of solving the largest automata first is the better choice.

In addition one of the test cases used to benchmark the original algorithm were transferlines of varying sizes. The transferline model of an arbitrary number of functional blocks which can be combined into a large system with a regular structure [18].

The original algorithm was shown to be capable of solving the transferline model by exploring a number states which was linearly proportional to the number of blocks in the model. Thus as a test we also ran the modular checker implemented in this project using the MaxCommonEvents heuristic, on transferlines with numbers of functional blocks between 1 and 230 and plotted the number of states explored against the number of functional blocks in the transferline. The chart of this can be seen in Figure 3.3 and clearly shows a linear relationship between states explored and the size of the transferline.

Model					Modular l	Language Inclusion							
		All	Early	Late	MaxCommon	Min	Min	Min	Min	One	RelMax		
			NotAccept	NotAccept	Events	Events	NewEvents	States	Transitions		Common		
Name	Aut	States	States	States	States	States	States	States	States	States	States		
big_cmft_kl50	32	753	118	77	1669	3868	1309	53	118	3305	432		
big_fh_cmftreq1	32	23	7	7	7	52	2684	7	7	52	52		
big_manual_cmft	32	765	6323	40	60	438	8789	13	40	1178	438		
ftechnik_nocoll	42	271242	4309	2666552									
profisafe_i4_host_to	76	419	13571	2409	277605	77038	41148						
profisafe_i4_slave	76	24612	475262	4450	11496	36377	274723	64953	454711	12635			
profisafe_o4_host_to	85	436	13575	2454	277160	77044	40899						
profisafe_o4_slave	85	2907	1690	10611	1079247	17662							
tbed_nocoll	109	5144173	335791										
tbed_noderail	96	112	3287	8395939	623	4273	1245						
verriegel4_vrprop	66	34326	23709	23709	22614	23709	23709	11000	23709	11000	23709		
big_cmft_req	32	1465	1548	1572	1548	1572	1385	1572	1572	1548	1572		
big_fh_cmftreq0	32	2296	3584	5809	3851	3851	6261	6276	3894	4715	3851		
verriegel4_erprop	66	538	759	759	759	1716	1716	759	759	1571	700		

Table 3.1 ORIGINAL MODULAR LANGUAGE INCLUSION CHECK

 Table 3.2

 ORIGINAL MODULAR CONTROLLABILITY CHECK PREFERRING PLANTS

Model					Modular cont	rollability, not	t preferring	plants			
		All	Early	Late	MaxCommon	MaxCommon	Min	Min	Min	One	RelMax
			NotAccept	NotAccept	Events	Uncontr	NewEvents	States	Transitions		$\operatorname{Common}$
Name	Aut	States	States	States	States	States	States	States	States	States	States
big_bmw	31	1096	190	190	411	223	1281	190	190	190	5219
fzelle	67	7793	18385	5366	4072	4072	7101	8990	8732	4901	3394
profisafe_i4	75	688	351	245	155	160	369	244	245	160	224
profisafe_04	84	691	354	248	158	163	372	247	248	163	227
rhone_alps	35	224616	1035198	16021	224838	16432	16063	903	903	955	1037531
tbed_ctct	84	119934	29092	18522	18522	3557956					l l
tbed_valid	84	609040	3733989								
verriegel4	65	32027	655	23142	1730	19103	7859	7859	75704	2956	
ftechnik	- 36	159118	9879	221	221	221	6557213	6571455	4547036	683	
tbed_uncont	58	821906	310893	5772225	2158804	1536444	999512				

Table 3.3 ORIGINAL MODULAR CONTROLLABILITY CHECK NOT PREFERRING PLANTS

Model					Modular co	ontrollability, j	preferring p	lants			
		All	Early	Late	MaxCommon	MaxCommon	Min	Min	Min	One	RelMax
			NotAccept	NotAccept	Events	Uncontr	NewEvents	States	Transitions		Common
Name		States	States	States	States	States	States	States	States	States	States
big_bmw	31	346	190	190	223	223	339	190	190	190	1110
fzelle	67	9711	9733	7799	6316	6826	7882	8990	8732	4901	5658
profisafe_i4	75	688	351	245	155	160	369	244	245	160	224
profisafe_04	84	691	354	248	158	163	372	247	248	163	227
rhone_alps	35	224614	903	16021	8367	8333	16063	903	903	955	37030
tbed_ctct	84	119934	29092	18522	18522	3557956					
tbed_valid	84										
verriegel4	65	1227894	31666	7859	9454	8956	42931	7859	7859	75704	16605
ftechnik	36	1089179	2376834	6568826	3428725	3429005	6783622	6557213	6571455	4547036	5854300
tbed_uncont	58	281589	6517643	1536444							

Table 3.4
MODULAR LANGUAGE INCLUSION CHECK

					Ta	able 3.	.4						
		MOD	ULA	R LAI	NGUA	AGE I	NCL	USIO	N CHE	ECK			
Model					N	Modula	r Lang	guage I	nclusio	n			
		A	11	Ea		La	,	<u> </u>	ommon	Ma	ax	Mi	in
				NotA	ccept	NotA	$\operatorname{ccept}$	Eve	ents	Stat	tes	Eve	nts
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
profisafe_i4_slave	15	13179	0.15			16969		11515	-	16958	0.31	1238	
profisafe_04_slave	17	10426				18806		16428	0.37	12414	0.43		
big_bmw	32	1465		1548				1548	0.06		0.06	1572	
ftechnik	37	71973	3.95		12.51		20.25		42.19		16.6		20.2
tbed_nocoll	85		33.28		38.97		38.96	3639			14.14		32.4
tbed_noderail	85		14.38		57.66		32.52		27.15		56.7		24.27
verriegel4	66	580	0.02					805	0.03	1680	0.05		0.05
	29	2155			0.22	-	-	2491	0.22	1671	0.22	1532	
1	31	2155	0.18	2758	0.22	-		2491	0.23		0.22	1532	
T	29	2462	0.22	3294	0.26			2893	0.26		0.25		-
1	31	2462	0.21	3294	0.27	1616		2893	0.27	1869	0.25		-
T	29	2769	0.24	3830	0.32	-	0.28	3295	0.31	2067	0.3	2114	
1	31	2769	0.25					3295	0.31	2067	0.29	2114	0.26
Model		Mi		M		M		0	ne	RelN			
		NewE		Sta		Trans				Com			
Name		States						States		States			
1	15	18831	0.31		0.14		-	16969	0.31		0.31		
profisafe_04_slave		25202				14167		23820	0.47		0.33		
big_bmw	32	1572	0.03		0.03		0.04	1548	0.05		0.03		
ftechnik	37		20.62		65.95		52.52		10.59		23.92		
tbed_nocoll	85		38.78		51.71		29.61		64.51		23.19		
tbed_noderail	85		25.97		50.47		26.27	1000	27.38		14.31		
verriegel4	66	1680	0.05		0.03			1680	0.05		0.03		
L	29	2223							0.22	2223	0.23		
T	31	2223	-	2170	0.23			1648	0.22	2223	0.24		
1	29	2530		2477	0.27	1514	-	1846	0.25		0.28		
T	31	2530		2477	0.27	1514		1846	0.25		0.29		
r · · · · · · · · · · · · · · · · · · ·	29 21	2837		2784	0.31		-	2044	0.29		0.32		
profisafe_o6_host	31	2837	0.32	2784	0.31	1712	0.24	2044	0.29	2837	0.32		

Table 3.5
MODULAR CONTROLLABILITY CHECK PREFERRING PLANTS, LARGEST
CONTROLLER FIRST

Model			Me	odular o	ontrol	lability,	preferri	ng plan	ts, larg	est con	troller	first	
		Al	1	Ear	~	Lat					ommon		
				NotA		NotAc	ccept	Eve	nts		$\operatorname{contr}$	Sta	tes
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	4931	0.11	5036	0.1	5447	0.09	5032	0.09	5013	0.08	5463	0.1
fzelle	67	7922	0.17	1421	0.15	1249	0.15	1545	0.16	2212	0.17	2122	0.15
rhone_alps	35	17319	0.1	10041	0.16	16327	0.11	842	0.04	10293	0.09	16755	0.11
tbed_ctct	84	119806	0.41	18391	0.12		34.07	18391	0.12	22298	0.13		26.68
tbed_nocoll	84		19.42		47.39		31.83		14.64		14.64		30.88
tbed_noderail	84		19.77		55.94		45		14.82		14.79		35.04
verriegel4	65	26428	0.27	30341	0.37	1310	0.12	2488	0.15	16250	0.23	33318	0.37
profisafe_i4	80	56	0.09	124	0.12	63	0.09	41	0.08	63	0.1	41	0.08
profisafe_i4_host	28	48	0.07	112	0.09	58	0.08	36	0.06	58	0.08	36	0.05
profisafe_i4_slave	14	8	0.02	12	0.04	5	0.03	5	0.03	5	0.02	5	
profisafe_i5	88	56	0.1	124	0.14	63	0.11	41	0.1	63	0.11	41	0.09
profisafe_i5_host	28	48	0.07	112	0.1	58	0.09	36	0.06	58	0.09	36	0.07
profisafe_i6	94	56	0.12	124	0.16	63	0.14	41	0.1	63	0.14	41	0.11
profisafe_i6_host	28	48	0.09	112	0.12	58	0.1	36	0.07	58	0.1	36	0.07
profisafe_inclusion_i4host	78	184	0.08	143	0.11	52	0.07	66	0.07	276	0.13	130	
profisafe_inclusion_o4host	84	184	0.09	143	0.11	52	0.08	66	0.08	276	0.13		
profisafe_inclusion_o4slave	84	184	0.09	143	0.11	52	0.08	66	0.08	276	0.13	130	
profisafe_04	90	56	0.09	124	0.13	63	0.11	41	0.08	63	0.11	41	0.08
profisafe_o4_host	30	48	0.06	112	0.09	58	0.08	36	0.06	58	0.08	36	
profisafe_o4_slave	16	8	0.03	12	0.04	5	0.04	5	0.03	5	0.03	5	0.03
profisafe_o5	99	56	0.11	124	0.15	63	0.13	41	0.1	63	0.13	41	0.1
profisafe_o5_host	30	48	0.08	112	0.11	58	0.09	36	0.06	58	0.09	36	0.06
profisafe_06	106	56	0.13	124	0.18	63	0.14	41	0.12	63	0.15	41	0.12
profisafe_o6_host	30	48	0.09	112	0.12	58	0.1	36	0.08	58	0.1	36	0.07
ftechnik	36		45.01	177113	1.19		98.31	587588	2.87		30.92		101.97
rhone_tough	61		20.53		21.09		33.27		32.99		8.75		21.6
tbed_uncont	84		19.48		47.43		31.93		26.02		25.87		30.69
	04		19.40		47.43		51.95		20.02		20.01		30.09
Model	04	Mi	n	Mi	n	Mi	n	М	in	0	ne 25.87	Rell	Max
	04	Mi Ever	n	Mi NewE	n	Mi Stat	n	M Trans	in	0		Rell Com	Max
	Aut	Ever States	n	NewE States	n vents	Stat States	n	Trans States	in	States	ne Time	Com States	Max mon Time
Model Name big_bmw	Aut 31	Ever States 5317	n nts	NewE States 5317	n vents	States 5613	n tes Time 0.08	Trans States 5317	in itions Time 0.09	States 5056	ne Time 0.09	Com States 5013	Max mon Time 0.09
Model Name	Aut 31 67	Ever States 5317 1735	n nts <u>Time</u> 0.08 0.17	NewE States 5317 1653	n vents Time 0.09 0.16	States 5613 3184	n tes 0.08 0.2	Trans States 5317 2959	in itions Time 0.09 0.19	States 5056 2311	ne Time 0.09 0.16	Com States 5013 1625	Max mon Time 0.09 0.16
Model Name big_bmw fzelle rhone_alps	Aut 31 67 35	Ever States 5317	n nts <u>Time</u> 0.08 0.17 0.05	NewE States 5317	n vents 0.09 0.16 0.05	States 5613 3184 1158	n Time 0.08 0.2 0.05	Trans States 5317	in itions Time 0.09 0.19 0.05	States 5056	ne <u>Time</u> 0.09 0.16 0.05	Com States 5013 1625 872	Max mon Time 0.09 0.16 0.04
Model Name big_bmw fzelle rhone_alps tbed_ctct	Aut 31 67 35 84	Ever States 5317 1735	n nts 0.08 0.17 0.05 33.59	NewE States 5317 1653	n Vents 0.09 0.16 0.05 28	States 5613 3184	n Time 0.08 0.2 0.05 20.36	Trans States 5317 2959	in itions Time 0.09 0.19 0.05 18.09	States 5056 2311 1158	ne Time 0.09 0.16 0.05 24.17	Com States 5013 1625	Max mon Time 0.09 0.16 0.04 0.82
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll	Aut 31 67 35	Ever States 5317 1735	n nts <u>Time</u> 0.08 0.17 0.05 33.59 26.85	NewE States 5317 1653	n vents 0.09 0.16 0.05 28 30.35	States 5613 3184 1158	n Time 0.08 0.2 0.05 20.36 58.96	Trans States 5317 2959	in itions <u>Time</u> 0.09 0.19 0.05 18.09 71.43	States 5056 2311 1158	ne Time 0.09 0.16 0.05 24.17 34.89	Com States 5013 1625 872	Max mon Time 0.09 0.16 0.04 0.82 16.71
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail	Aut 31 67 35 84 84 84	Ever States 5317 1735 1158	n nts 0.08 0.17 0.05 33.59 26.85 29.27	NewE States 5317 1653 872	n vents 0.09 0.16 0.05 28 30.35 30.63	States 5613 3184 1158 3563784	n Time 0.08 0.2 0.05 20.36 58.96 59.09	Trans States 5317 2959 1158	in itions Time 0.09 0.19 0.05 18.09 71.43 74.02	States 5056 2311 1158	ne Time 0.09 0.16 0.05 24.17 34.89 51.78	Com States 5013 1625 872 219497	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4	Aut 31 67 35 84 84 84 65	Even <u>States</u> 5317 1735 1158 1915	n nts Time 0.08 0.17 0.05 33.59 26.85 29.27 0.13	NewE States 5317 1653 872 1209	n vents 0.09 0.16 0.05 28 30.35 30.63 0.12	States 5613 3184 1158 3563784 1209	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12	Trans States 5317 2959 1158 1112	in itions $\overline{\text{Time}}$ 0.09 0.19 0.05 18.09 71.43 74.02 0.12	States 5056 2311 1158 33118	ne Time 0.09 0.16 0.05 24.17 34.89 51.78 0.34	Com <u>States</u> 5013 1625 872 219497 1209	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4	Aut 31 67 35 84 84 84 65 80	Ever 5317 1735 1158 1915 63	n nts <u>Time</u> 0.08 0.17 0.05 33.59 26.85 29.27 0.13 0.09	NewE States 5317 1653 872 1209 41	n <u>Time</u> 0.09 0.16 0.05 28 30.35 30.63 0.12 0.08	States 5613 3184 1158 3563784 1209 69	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11	Trans States 5317 2959 1158 1112 70	in itions <u>Time</u> 0.09 0.19 0.05 18.09 71.43 74.02 0.12 0.1	States 5056 2311 1158 33118 63	ne Time 0.09 0.16 0.05 24.17 34.89 51.78 0.34 0.09	Com States 5013 1625 872 219497 1209 41	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host	Aut 31 67 35 84 84 84 65 80 28	Ever 5317 1735 1158 1915 63 36	n Time 0.08 0.17 0.05 33.59 26.85 29.27 0.13 0.09 0.06	NewE States 5317 1653 872 1209 41 36	n <u>Time</u> 0.09 0.16 0.05 28 30.35 30.63 0.12 0.08 0.06	States           5613           3184           1158           3563784           1209           69           64	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08	Trans States 5317 2959 1158 1112 70 36	in itions Time 0.09 0.19 0.05 18.09 71.43 74.02 0.12 0.1 0.05	States 5056 2311 1158 33118 63 58	ne Time 0.09 0.16 0.05 24.17 34.89 51.78 0.34 0.09 0.08	Com States 5013 1625 872 219497 1209 41 36	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.05
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave	Aut 31 67 35 84 84 84 65 80 28 14	Even <u>5317</u> 1735 1158 1915 63 36 5	n Time 0.08 0.17 0.05 33.59 26.85 29.27 0.13 0.09 0.06 0.03	NewE <u>States</u> 5317 1653 872 1209 41 36 5	n Vents Time 0.09 0.16 0.05 28 30.35 30.63 0.12 0.08 0.06 0.03	State           5613           3184           1158           3563784           1209           69           64           5	n tes Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03	Trans States 5317 2959 1158 1112 70 36 12	in itions Time 0.09 0.19 0.05 18.09 71.43 74.02 0.12 0.1 0.05 0.03	States 5056 2311 1158 33118 63 58 58 5	ne Time 0.09 0.16 0.05 24.17 34.89 51.78 0.34 0.09 0.08 0.02	Com States 5013 1625 872 219497 1209 41 36 5	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.05 0.03
Model Name big.bmw fzelle rhone.alps tbed.ctct tbed.nocoll tbed.nocoll tbed.noderail verriegel4 profisafe.i4_host profisafe.i4_slave profisafe.i5	Aut 31 67 35 84 84 84 65 80 28 14 88	Ever States 5317 1735 1158 1915 63 36 5 70	n Time 0.08 0.17 0.05 33.59 26.85 29.27 0.13 0.09 0.06 0.03 0.13	NewE States 5317 1653 872 1209 41 36 5 41	n vents Time 0.09 0.16 0.05 28 30.35 30.63 0.12 0.08 0.06 0.03 0.09	State           5613           3184           1158           3563784           1209           69           64           5           69	n tes <u>Time</u> 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03 0.12	Trans States 5317 2959 1158 1112 70 36 12 70	in itions <u>Time</u> 0.09 0.19 0.05 18.09 71.43 74.02 0.12 0.12 0.1 0.05 0.03 0.13	States 5056 2311 1158 33118 63 58 5 63	ne Time 0.09 0.16 0.05 24.17 34.89 51.78 0.34 0.09 0.08 0.02 0.1	Com States 5013 1625 872 219497 1209 41 36 5 41	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.05 0.03 0.03 0.09
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocent tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host	Aut 31 67 35 84 84 84 65 80 28 14 88 28	Ever <u>States</u> 5317 1735 1158 1915 63 366 5 70 36	n nts <u>Time</u> 0.08 0.17 0.05 33.59 26.85 29.27 0.13 0.09 0.06 0.03 0.13 0.06	NewE States 5317 1653 872 1209 41 36 5 41 36	n vents Time 0.09 0.16 0.05 28 30.35 30.63 0.12 0.08 0.06 0.03 0.09 0.06	States           5613           3184           1158           3563784           1209           69           64           5           69           64	n tes Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03 0.12 0.1	Trans States 5317 2959 1158 1112 70 366 12 70 36 36	in itions <u>Time</u> 0.09 0.19 0.05 18.09 71.43 74.02 0.12 0.12 0.11 0.05 0.03 0.13 0.06	States 5056 2311 1158 33118 63 58 5 63 58 58	ne <u>Time</u> 0.09 0.16 0.05 24.17 34.89 51.78 0.34 0.03 0.08 0.02 0.1 0.09	Com States 5013 1625 872 219497 1209 41 36 5 41 36	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.05 0.03 0.09 0.06
Model Name big_bmw fzelle rhone_alps tbed_tct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_alave profisafe_i5_host profisafe_i6_bost	Aut 31 67 35 84 84 65 80 28 14 88 28 94	Ever <u>States</u> 5317 1735 1158 1915 63 366 5 70 366 70 366 70		NewE States 5317 1653 872 1209 41 366 5 41 366 41		States           5613           3184           1158           3563784           1209           69           64           5           69           64           5           69           64           5	n tes Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.03 0.12 0.1 0.15	Trans States 5317 2959 1158 1112 700 366 122 700 366 70	in itions Time 0.09 0.19 0.05 18.09 71.43 74.02 0.12 0.12 0.03 0.03 0.13 0.06 0.14	States 5056 2311 1158 33118 63 58 5 63 58 63 58 63	ne <u>Time</u> 0.09 0.16 0.05 24.17 34.89 51.78 0.34 0.09 0.02 0.1 0.09 0.13	Com States 5013 1625 872 219497 1209 41 36 5 41 36 41	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.03 0.03 0.09 0.06 0.11
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5 profisafe_i6 profisafe_i6_host	Aut 31 67 35 84 84 65 80 28 14 88 28 94 28	Ever States 5317 1735 1158 1915 63 366 5 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 70 70 70 70 70 70 70 70 70	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \end{array}$	NewE States 5317 1653 872 1209 41 36 5 41 36 41 36 41		States           5613           3184           1158           3563784           1209           69           64           69           64           69           64           69           64	n tes Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03 0.12 0.11 0.15 0.12	Trans States 5317 2959 1158 1112 70 366 12 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 70 70 70 70 70 70 70 70 70		States 5056 2311 1158 33118 63 58 63 58 63 58 63 58	$\begin{array}{c} \text{ne} \\ \hline \\ $	Com States 5013 1625 872 219497 1209 41 366 5 41 366 41 366	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.05 0.03 0.09 0.06 0.11 0.07
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocenal verriegel4 profisafe_i4 profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_i6_host	Aut 31 67 35 84 84 65 80 28 44 88 28 94 28 78	Ever States 5317 1735 1158 1915 63 366 5 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 70 70 70 70 70 70 70 70 70	$\begin{array}{c} n \\ \text{nts} \\ \hline \text{Time} \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.16 \end{array}$	NewE States 5317 1653 872 1209 41 36 5 41 36 41 36 324	$\begin{array}{c} n \\ \hline {\bf Vents} \\ \hline {\bf Time} \\ 0.09 \\ 0.16 \\ 0.05 \\ 28 \\ 30.35 \\ 30.63 \\ 0.12 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.12 \end{array}$	States           5613           3184           1158           3563784           1209           69           64           59           64           69           64           69           64           75           69           64           69           64           69           64           69           64           67           67           67           67           67           67           67           67           68           69           64           69           64           69           64           761	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03 0.12 0.11 0.15 0.12 0.17	Trans States 5317 2959 1158 1112 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 366 70 70 70 70 70 70 70 70 70 70	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \end{array}$	States 5056 2311 1158 33118 63 58 63 58 63 58 63 58 63 358 63	$\begin{array}{c} \text{ne} \\ \hline \text{Time} \\ 0.09 \\ 0.16 \\ 0.05 \\ 24.17 \\ 34.89 \\ 51.78 \\ 0.34 \\ 0.09 \\ 0.08 \\ 0.02 \\ 0.1 \\ 0.09 \\ 0.13 \\ 0.1 \\ 0.13 \end{array}$	Com States 5013 1625 872 219497 1209 41 366 5 41 366 41 366 252	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.05 0.03 0.09 0.06 0.11 0.07 0.1
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Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84	Ever <u>States</u> 5317 1735 1158 1915 63 36 5 70 36 70 36 1728 1721 1728	$\begin{array}{c} n \\ mts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.16 \\ 0.16 \\ 0.17 \end{array}$	NewE States 5317 1653 872 1209 41 366 5 41 366 41 364 324 324 324	$\begin{array}{c} n \\ \hline {\bf Vents} \\ \hline {\bf Time} \\ 0.09 \\ 0.16 \\ 0.05 \\ 28 \\ 30.35 \\ 30.63 \\ 0.12 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.13 \\ 0.14 \end{array}$	States           5613           3184           1158           3563784           1209           69           64           5           69           64           761           7611           761	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.03 0.12 0.12 0.15 0.12 0.17 0.18 0.18	Trans <u>States</u> 5317 2959 1158 1112 70 366 12 70 36 70 36 70 36 70 36 70 36 70 36 70 36 70 36 70 70 36 70 70 70 70 70 70 70 70 70 70	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \end{array}$	States           5056         2311           1158         33118           63         58           53         58           63         58           33313         333	$\begin{array}{c} \text{ne} \\ \hline \\ $	Com States 5013 1625 872 219497 1209 41 366 5 41 366 41 366 41 362 252 2522 252	$\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.11 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocent tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5 profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4	Aut 31 67 35 84 84 84 65 80 28 94 28 94 28 84 84 90	Ever States 5317 1735 1158 1915 63 36 5 70 36 1728 174	$\begin{array}{c} n \\ mts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.16 \\ 0.16 \\ 0.17 \\ 0.11 \\ \end{array}$	NewE States 5317 1653 872 1209 41 36 5 41 36 41 36 324 324 324 41	$\begin{array}{c} n \\ \hline {\bf Vents} \\ \hline {\bf Time} \\ 0.09 \\ 0.16 \\ 0.05 \\ 28 \\ 30.35 \\ 30.63 \\ 0.12 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.13 \\ 0.14 \\ 0.09 \end{array}$	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ \hline 5613 \\ 3184 \\ 1158 \\ 3563784 \\ \hline 1209 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 69 \\ 64 \\ 761 \\ 761 \\ 761 \\ 761 \\ 69 \\ \end{array}$	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03 0.12 0.11 0.15 0.12 0.17 0.18 0.12	Trans States 5317 2959 1158 1112 70 366 70 366 70 366 70 366 70 366 72 72 72 72 72 72 72 72 72		States           5056         2311           1158         33118           63         58           53         58           63         58           3333         333           333         63	$\begin{array}{c} \text{ne} \\ \hline \\ $	$\begin{array}{r} \mbox{Com} \\ \hline \mbox{States} \\ 5013 \\ 1625 \\ 872 \\ 219497 \\ 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 411 \\ 366 \\ 252 \\ 252 \\ 252 \\ 252 \\ 41 \\ \end{array}$	$\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.11 \\ 0.08 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_bost profisafe_i5_sost profisafe_i5_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_ profisafe_o4_host	Aut 31 67 35 84 84 65 80 28 94 28 94 28 88 84 84 90 30	Ever States 5317 1735 1158 1915 63 36 5 700 36 1728 1721 1728 1721 1728 36 36 36 36 36 36 36 36 36 36	$\begin{array}{c} n \\ \hline mts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.03 \\ 0.03 \\ 0.013 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.16 \\ 0.16 \\ 0.17 \\ 0.011 \\ 0.06 \end{array}$	NewE States 5317 1653 872 1209 41 366 5 41 366 41 364 324 324 324 324 324	n <u>Vents</u> <u>Time</u> 0.09 0.16 0.05 28 30.35 30.63 0.12 0.08 0.06 0.03 0.09 0.06 0.11 0.07 0.12 0.13 0.09 0.06 0.12 0.08 0.09 0.16 0.09 0.16 0.05 0.12 0.08 0.09 0.12 0.08 0.09 0.12 0.08 0.09 0.12 0.08 0.03 0.03 0.03 0.03 0.03 0.03 0.04 0.03 0.05 0.03 0.04 0.03 0.05 0.03 0.04 0.05 0.03 0.05 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.04 0.04 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.04 0.03 0.09 0.04 0.03 0.04 0.03 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04 0.09 0.04	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ \hline 5613 \\ 3184 \\ 1158 \\ 3563784 \\ \hline 1209 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 69 \\ 64 \\ 761 \\ 761 \\ 761 \\ 761 \\ 69 \\ 64 \\ \end{array}$	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03 0.12 0.11 0.15 0.12 0.17 0.18 0.12 0.12 0.19 0.12 0.19 0.12 0.10 0.12 0.11 0.15 0.12 0.12 0.15 0.12 0.12 0.15 0.12 0	Trans States 5317 2959 1158 1112 70 366 12 70 366 70 70 366 70 70 70 366 70 70 70 70 70 70 70 70 70 70	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.13 \\ 0.05 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.11 \\ 0.05 \end{array}$	States           5056         2311           1158         33118           63         58           53         63           58         63           58         333           333         58           63         58           63         58           63         58           63         58           63         58           63         58           58         58           58         58           63         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58	$\begin{array}{c} \text{ne} \\ \hline \\ $	$\begin{array}{r} \mbox{Com} \\ \hline \mbox{States} \\ \hline St$	Max mon Time 0.09 0.16 0.04 0.82 16.71 16.85 0.12 0.08 0.05 0.03 0.09 0.06 0.11 0.07 0.1 0.11 0.11 0.08 0.05
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Model Name big.bmw fzelle rhone.alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 88 48 90 30 16 99	Ever States 5317 1735 1158 1915 633 366 700 366 1728 1721 1728 633 366 5 41	$\begin{array}{c} n \\ mts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.16 \\ 0.16 \\ 0.17 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.01 \\ 0$	NewE States 5317 1653 872 1209 41 366 41 366 41 364 324 324 324 324 324 324 324 32	$\begin{array}{c} n \\ \hline {\bf vents} \\ \hline {\bf Time} \\ 0.09 \\ 0.16 \\ 0.05 \\ 28 \\ 30.35 \\ 30.63 \\ 0.02 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.01 \\ 0.07 \\ 0.12 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.06 \\ 0.03 \\ 0.01 \\$	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ \hline 5613 \\ 3184 \\ 1158 \\ 3563784 \\ \hline 1209 \\ 69 \\ 64 \\ 55 \\ 69 \\ 64 \\ 69 \\ 64 \\ 761 $	n Time 0.08 0.2 0.05 20.36 58.96 59.09 0.12 0.11 0.08 0.03 0.12 0.17 0.18 0.18 0.18 0.12 0.07 0.18 0.12 0.03 0.14	Trans           States           5317           2959           1158           1112           700           366           70           366           72 <td><math display="block">\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.11 \\ 0.12 \\ 0.11 \\ 0.05 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \end{array}</math></td> <td>States           5056           2311           1158           33118           63           58           63           58           333           333           53           58           63           58           63           58           63           58           58           63           58           58           58           63           58           58           63           58           63           58           63           58           63</td> <td><math display="block">\begin{array}{c} \text{ne} \\ \hline \text{Time} \\ \hline 0.09 \\ 0.16 \\ 0.05 \\ 24.17 \\ 34.89 \\ 51.78 \\ 0.34 \\ 0.09 \\ 0.08 \\ 0.02 \\ 0.11 \\ 0.09 \\ 0.13 \\ 0.11 \\ 0.13 \\ 0.14 \\ 0.14 \\ 0.14 \\ 0.14 \\ 0.13 \\ 0.12 \\ \end{array}</math></td> <td><math display="block">\begin{array}{r} \hline \text{Com} \\ \hline \text{States} \\ \hline 5013 \\ 1625 \\ 872 \\ 219497 \\ 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 411 \\ 366 \\ 2552 \\ 2552 \\ 2552 \\ 2552 \\ 411 \\ 366 \\ 5 \\ 41 \\ \end{array}</math></td> <td><math display="block">\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.11 \\ 0.11 \\ 0.11 \\ 0.11 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.01 \\ \end{array}</math></td>	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.11 \\ 0.12 \\ 0.11 \\ 0.05 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \end{array}$	States           5056           2311           1158           33118           63           58           63           58           333           333           53           58           63           58           63           58           63           58           58           63           58           58           58           63           58           58           63           58           63           58           63           58           63	$\begin{array}{c} \text{ne} \\ \hline \text{Time} \\ \hline 0.09 \\ 0.16 \\ 0.05 \\ 24.17 \\ 34.89 \\ 51.78 \\ 0.34 \\ 0.09 \\ 0.08 \\ 0.02 \\ 0.11 \\ 0.09 \\ 0.13 \\ 0.11 \\ 0.13 \\ 0.14 \\ 0.14 \\ 0.14 \\ 0.14 \\ 0.13 \\ 0.12 \\ \end{array}$	$\begin{array}{r} \hline \text{Com} \\ \hline \text{States} \\ \hline 5013 \\ 1625 \\ 872 \\ 219497 \\ 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 411 \\ 366 \\ 2552 \\ 2552 \\ 2552 \\ 2552 \\ 411 \\ 366 \\ 5 \\ 41 \\ \end{array}$	$\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.11 \\ 0.11 \\ 0.11 \\ 0.11 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.01 \\ \end{array}$
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Trans           States           5317           2959           1158           1112           70           366           70           366           72           72           72           70           366           72           73           74           75           76 <td><math display="block">\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.13 \\ 74.02 \\ 0.12 \\ 0.14 \\ 0.03 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.06 \end{array}</math></td> <td>States           5056         2311           1158         33118           63         58           533         58           533         333           333         63           58         58           63         58           58         63           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58</td> <td><math display="block">\begin{array}{c} \text{ne} \\ \hline \\ </math></td> <td><math display="block">\begin{array}{r} \hline \text{Com} \\ \hline \text{States} \\ \hline 5013 \\ 1625 \\ 872 \\ 219497 \\ 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 252 \\ 252 \\ 252 \\ 252 \\ 252 \\ 411 \\ 36 \\ 5 \\ 41 \\ 36 \\ 16 \\ 36 \\ 5 \\ 41 \\ 36 \\ 36 \\ 5 \\ 41 \\ 36 \\ 36 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ </math></td> <td><math display="block">\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.11 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ \end{array}</math></td>	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.13 \\ 74.02 \\ 0.12 \\ 0.14 \\ 0.03 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.06 \end{array}$	States           5056         2311           1158         33118           63         58           533         58           533         333           333         63           58         58           63         58           58         63           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58	$\begin{array}{c} \text{ne} \\ \hline \\ $	$\begin{array}{r} \hline \text{Com} \\ \hline \text{States} \\ \hline 5013 \\ 1625 \\ 872 \\ 219497 \\ 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 252 \\ 252 \\ 252 \\ 252 \\ 252 \\ 411 \\ 36 \\ 5 \\ 41 \\ 36 \\ 16 \\ 36 \\ 5 \\ 41 \\ 36 \\ 36 \\ 5 \\ 41 \\ 36 \\ 36 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 5 \\ 5 \\ 41 \\ 36 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ $	$\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.11 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ \end{array}$
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Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_ profisafe_i5_ profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host	Aut 31 67 35 84 84 84 85 80 28 14 88 28 94 28 94 28 94 28 94 30 16 99 30 106 30	$\begin{array}{r} {\rm Ever}\\ {\rm States}\\ {\rm 5317}\\ {\rm 1735}\\ {\rm 11735}\\ {\rm 1158}\\ {\rm 1915}\\ {\rm 63}\\ {\rm 366}\\ {\rm 5}\\ {\rm 70}\\ {\rm 366}\\ {\rm 1728}\\ {\rm 1721}\\ {\rm 1728}\\ {\rm 633}\\ {\rm 366}\\ {\rm 55}\\ {\rm 41}\\ {\rm 36}\\ \end{array}$	$\begin{array}{c} n \\ mts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.66 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.16 \\ 0.16 \\ 0.17 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.02 \\ 0.07 \\ 0.12 \\ 0.07 \\ 0.12 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.00 \\ 0.07 \\ 0.00 \\ 0$	$\begin{array}{r} {\rm NewE}\\ {\rm States}\\ 5317\\ 1653\\ 872\\ 1209\\ 41\\ 366\\ 5\\ 411\\ 366\\ 411\\ 366\\ 324\\ 324\\ 412\\ 324\\ 411\\ 366\\ 5\\ 411\\ 366\\ 55\\ 411\\ 366\\ 410\\ 410\\ 410\\ 410\\ 410\\ 410\\ 410\\ 410$	n <u>Vents</u> <u>Time</u> 0.09 0.16 0.05 28 30.35 30.63 0.02 0.08 0.06 0.03 0.09 0.06 0.11 0.07 0.12 0.03 0.14 0.09 0.06 0.13 0.09 0.06 0.03 0.12 0.03 0.09 0.06 0.03 0.12 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.12 0.03 0.02 0.03 0.02 0.03 0.03 0.03 0.02 0.03 0.12 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.12 0.03 0.03 0.03 0.03 0.04 0.03 0.04 0.03 0.04 0.03 0.07 0.02 0.03 0.07 0.07 0.02 0.03 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.03 0.07	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ \hline 5613 \\ 3184 \\ 1158 \\ 3563784 \\ \hline 1209 \\ 69 \\ 644 \\ 55 \\ 69 \\ 644 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 64 \\ 5 \\ 69 \\ 64 \\ 64 \\ 5 \\ 69 \\ 64 \\ 64 \\ 5 \\ 69 \\ 64 \\ 64 \\ 5 \\ 69 \\ 64 \\ 64 \\ 64 \\ 5 \\ 69 \\ 64 \\ 64 \\ 64 \\ 64 \\ 64 \\ 64 \\ 64$		Trans           States           5317           2959           1158           1112           70           366           70           366           72           72           72           70           366           72           73           74           75           76 <td><math display="block">\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.06 \\ 0.13 \\ 0.07 \end{array}</math></td> <td><math display="block">\begin{array}{r} {\rm States} \\ 5056 \\ 2311 \\ 1158 \\ 33118 \\ 63 \\ 58 \\ 55 \\ 63 \\ 58 \\ 63 \\ 333 \\ 333 \\ 333 \\ 63 \\ 58 \\ 58 \\ 58 \\ 63 \\ 58 \\ 58 \\ 58 \\ 58 \\ 58 \\ 58 \\ 58 \\ 5</math></td> <td><math display="block">\begin{array}{c} \text{ne} \\ \hline \\ </math></td> <td><math display="block">\begin{array}{c} \text{Com} \\ \hline \text{States} \\ 5013 \\ 1625 \\ 872 \\ 219497 \\ 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 252 \\ 252 \\ 252 \\ 252 \\ 252 \\ 411 \\ 366 \\ 5 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ </math></td> <td><math display="block">\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.02 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.08 \\ 0.011 \\ 0.08 \end{array}</math></td>	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.06 \\ 0.13 \\ 0.07 \end{array}$	$\begin{array}{r} {\rm States} \\ 5056 \\ 2311 \\ 1158 \\ 33118 \\ 63 \\ 58 \\ 55 \\ 63 \\ 58 \\ 63 \\ 333 \\ 333 \\ 333 \\ 63 \\ 58 \\ 58 \\ 58 \\ 63 \\ 58 \\ 58 \\ 58 \\ 58 \\ 58 \\ 58 \\ 58 \\ 5$	$\begin{array}{c} \text{ne} \\ \hline \\ $	$\begin{array}{c} \text{Com} \\ \hline \text{States} \\ 5013 \\ 1625 \\ 872 \\ 219497 \\ 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 252 \\ 252 \\ 252 \\ 252 \\ 252 \\ 411 \\ 366 \\ 5 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ $	$\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.02 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.08 \\ 0.011 \\ 0.08 \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_noccll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_slave profisafe_o5_host profisafe_o5_host profisafe_o6_host ftechnik	$\begin{array}{c} {\rm Aut}\\ 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 88\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 99\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ 30\\ 36\\ \end{array}$	$\begin{array}{r} \text{Ever}\\ \hline \text{States}\\ \hline 5317\\ 1735\\ 11735\\ 1158\\ \hline \\ 1915\\ 63\\ 36\\ 5\\ 70\\ 36\\ 70\\ 36\\ 1728\\ 1721\\ 1728\\ 63\\ 36\\ 5\\ 41\\ 36\\ 41\\ \end{array}$	$\begin{matrix} n \\ mts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 3.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 30.06 \\ 0.09 \\ 0.00 \\ 0.00 \\ 0.00 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.016 \\ 0.017 \\ 0.06 \\ 0.02 \\ 0.07 \\ 82.48 \end{matrix}$	NewE States 5317 1653 872 1209 41 36 5 41 36 41 36 324 324 324 41 36 5 5 41 36 41 36 5 5 41 36 5 5 41 36 5 5 41 36 5 5 5 7 2 8 7 8 7	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.16 \\ 0.05 \\ 28 \\ 30.35 \\ 30.63 \\ 0.02 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.011 \\ 0.07 \\ 0.12 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.07 \\ 82.47 \end{array}$	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ \hline 5613 \\ 3184 \\ 1158 \\ 33563784 \\ \hline 1209 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 64$	$\begin{array}{c} n \\ \hline {\rm Time} \\ \hline {\rm O.08} \\ 0.02 \\ 0.055 \\ 20.36 \\ 58.96 \\ 59.09 \\ 0.12 \\ 0.11 \\ 0.08 \\ 0.03 \\ 0.12 \\ 0.11 \\ 0.15 \\ 0.12 \\ 0.17 \\ 0.18 \\ 0.12 \\ 0.17 \\ 0.18 \\ 0.12 \\ 0.09 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.16 \\ 0.12 \\ 115.13 \end{array}$	$\begin{array}{r} {\rm Trans} \\ {\rm States} \\ {\rm 5317} \\ {\rm 2959} \\ {\rm 1158} \\ \\ {\rm 1112} \\ {\rm 70} \\ {\rm 36} \\ {\rm 72} \\ {\rm 72}$	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.11 \\ 0.05 \\ 0.03 \\ 0.13 \\ 0.05 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.011 \\ 0.011 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.13 \\ 0.07 \\ 150.36 \end{array}$	States           5056         2311           1158         33118           63         58           63         58           63         58           63         58           63         58           63         58           63         58           63         58           63         58           63         58           63         58           58         58           63         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           58         58           63         58	$\begin{array}{c} \text{ne} \\ \hline \text{Time} \\ 0.09 \\ 0.16 \\ 0.05 \\ 24.17 \\ 34.89 \\ 51.78 \\ 0.34 \\ 0.09 \\ 0.08 \\ 0.02 \\ 0.1 \\ 0.09 \\ 0.13 \\ 0.11 \\ 0.13 \\ 0.14 \\ 0.11 \\ 0.13 \\ 0.14 \\ 0.11 \\ 0.08 \\ 0.03 \\ 0.12 \\ 0.09 \\ 0.14 \\ 0.11 \\ 15.95 \end{array}$	$\begin{array}{r} \hline \text{Com} \\ \hline \text{States} \\ \hline 5013 \\ 1625 \\ 872 \\ 219497 \\ \hline 1209 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 411 \\ 366 \\ 2552 \\ 2552 \\ 2552 \\ 411 \\ 366 \\ 5 \\ 411 \\ 366 \\ 41 \\ \hline 366 \\ 41 \\ \hline \end{array}$	$\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.088 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.01 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.06 \\ 0.01 \\ 0.08 \\ 2.67 \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_ profisafe_i5_ profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host	Aut 31 67 35 84 84 84 85 80 28 14 88 28 94 28 94 28 94 28 94 30 16 99 30 106 30	$\begin{array}{r} \text{Ever}\\ \hline \text{States}\\ \hline 5317\\ 1735\\ 11735\\ 1158\\ \hline \\ 1915\\ 63\\ 36\\ 5\\ 70\\ 36\\ 70\\ 36\\ 1728\\ 1721\\ 1728\\ 63\\ 36\\ 5\\ 41\\ 36\\ 41\\ \end{array}$	$\begin{array}{c} n \\ mts \\ \hline Time \\ 0.08 \\ 0.17 \\ 0.05 \\ 33.59 \\ 26.85 \\ 29.27 \\ 0.13 \\ 0.09 \\ 0.66 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.16 \\ 0.17 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.12 \\ 0.07 \\ \end{array}$	NewE States 5317 1653 872 1209 41 366 41 366 41 324 324 324 41 366 5 41 366 41 366	n <u>Vents</u> <u>Time</u> 0.09 0.16 0.05 28 30.35 30.63 0.02 0.08 0.06 0.03 0.09 0.06 0.11 0.07 0.12 0.03 0.14 0.09 0.06 0.13 0.09 0.06 0.03 0.12 0.03 0.09 0.06 0.03 0.12 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.09 0.06 0.03 0.12 0.03 0.02 0.03 0.02 0.03 0.03 0.03 0.02 0.03 0.12 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.12 0.03 0.03 0.03 0.03 0.04 0.03 0.04 0.03 0.04 0.03 0.07 0.02 0.03 0.07 0.07 0.02 0.03 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.07 0.03 0.07	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ \hline 5613 \\ 3184 \\ 1158 \\ 33563784 \\ \hline 1209 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 761 \\ 69 \\ 64 \\ 5 \\ 69 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 60 \\ 64 \\ 64$		$\begin{array}{r} {\rm Trans} \\ {\rm States} \\ {\rm 5317} \\ {\rm 2959} \\ {\rm 1158} \\ \\ {\rm 1112} \\ {\rm 700} \\ {\rm 366} \\ {\rm 122} \\ {\rm 700} \\ {\rm 366} \\ {\rm 700} \\ {\rm 366} \\ {\rm 722} \\ {\rm 724} \\ {\rm 326} \\ {\rm 488} \\ {\rm 336} \\ {\rm 488} \\ {\rm 336} \\ \end{array}$	$\begin{array}{c} \text{in} \\ \hline \text{itions} \\ \hline \hline \text{Time} \\ 0.09 \\ 0.19 \\ 0.05 \\ 18.09 \\ 71.43 \\ 74.02 \\ 0.12 \\ 0.12 \\ 0.12 \\ 0.03 \\ 0.13 \\ 0.06 \\ 0.13 \\ 0.06 \\ 0.14 \\ 0.07 \\ 0.09 \\ 0.11 \\ 0.11 \\ 0.05 \\ 0.04 \\ 0.11 \\ 0.06 \\ 0.13 \\ 0.07 \end{array}$	$\begin{array}{r} {\rm States}\\ \overline{5056}\\ 2311\\ 1158\\ 33118\\ 63\\ 58\\ 5\\ 63\\ 58\\ 333\\ 333\\ 333\\ 333\\ 63\\ 5\\ 5\\ 63\\ 5\\ 8\\ 63\\ 5\\ 8\\ 63\\ 5\\ 8\\ 63\\ 5\\ 8\\ 63\\ 5\\ 8\end{array}$	$\begin{array}{c} \text{ne} \\ \hline \\ $	$\begin{array}{r} \mbox{Com} \\ \hline \mbox{States} \\ \hline St$	$\begin{array}{c} {\rm Max} \\ {\rm mon} \\ \hline {\rm Time} \\ 0.09 \\ 0.16 \\ 0.04 \\ 0.82 \\ 16.71 \\ 16.85 \\ 0.12 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.08 \end{array}$

Model								erring p					
		Al	1	Ear		La		MaxCo					
				NotAc	<u> </u>	NotA	*	Eve			ontr	Stat	
Name	Aut	States	Time	States	Time			States	Time	States	Time	States	Time
big_bmw	31	1031	0.04	5036	0.08	4326	0.07	422	0.05	168	0.04	5463	0.08
fzelle	67	7922	0.16	23619	0.22	1249	0.14		0.15	2212	0.17		0.15
rhone_alps	35	17792	0.11	25217	0.15	16327	0.11	16018	0.09		0.09		0.11
tbed_ctct	84	119806	0.42	18391	0.13		17.66		0.13	22298	0.14		26.09
tbed_nocoll	84		18.59		57.29			107872	0.61		76.86		41.71
tbed_noderail	84	15005	18.87	01000	57.2	000	30.07		0.62	10470	66.67	00050	44.34
verriegel4	65 80	15625	0.19	31306	0.39	688	0.12			12479	0.2		0.39
profisafe_i4 profisafe_i4_host	$\frac{80}{28}$	44 36	$0.08 \\ 0.05$	124 112	0.12 0.32	63 58	$0.09 \\ 0.08$	41 36	$0.07 \\ 0.06$	41 36	$0.09 \\ 0.07$		$0.07 \\ 0.05$
profisafe_i4_slave	$14^{20}$	30	0.03	112	0.32	5	0.08	5	0.00	5	0.07		0.03
profisafe_i5	88	44	0.02	124	0.04		0.03	41	0.02	41	0.03	41	0.03 0.09
profisafe_i5_host	28	36	0.07	1124	0.15	58	0.12	36	0.05	36	0.08	36	0.05
profisafe_i6	$\frac{20}{94}$	44	0.11	112	0.15	63	0.03	41	0.11	41	0.00	41	0.00
profisafe_i6_host	$\frac{34}{28}$	36	0.07	1124	0.10	58	0.14	36	0.08	36	0.12	36	0.07
profisafe_inclusion_i4host	$\frac{20}{78}$	164	0.07	143	0.12	52	0.07	66	0.08	214	0.11	130	0.08
profisafe_inclusion_o4host	84	164	0.07	143	0.11	52	0.07	66	0.08	214 214	0.11		0.00
profisafe_inclusion_o4slave		164	0.08	143	0.11	52	0.08	66	0.08	214	0.13		0.09
profisafe_04	90	44	0.09	124	0.12	63	0.11	41	0.08	41	0.1	41	0.08
profisafe_o4_host	30	36	0.05	112	0.09	58	0.08	36	0.06	36	0.07	36	0.05
profisafe_o4_slave	16	8	0.03	12	0.04	5	0.03	5	0.03	5	0.03	5	0.03
profisafe_o5	99	44	0.1	124	0.15	63	0.13	41	0.1	41	0.12	41	0.1
profisafe_o5_host	30	36	0.06	112	0.11	58	0.09	36	0.06	36	0.08	36	0.06
profisafe_06	106	44	0.12	124	0.18	63	0.14	41	0.12	41	0.14	41	0.12
profisafe_06_host	30	36	0.07	112	0.12	58	0.1	36	0.07	36	0.1	36	0.07
ftechnik	36		31.9	177113	1.18		89.16	560434	2.76		21.24		67.03
rhone_tough	61		9.3		24.76		11.82		12.7		8.69		20.78
tbed_uncont	84	2.0	18.43		57.22		26.93		30.74	0	38.73	D 114	41.5
Model		Mi Ever		Mi NewE		Mi Sta		M Trans		0	ne	RelM Comm	
Name	Aut	States	Time	States		States	Time		Time	States	Time	States	Time
big_bmw	31	1046	0.06	168	0.04		0.04	168	0.05	5056	0.07	168	0.05
fzelle	67	61907	0.37	1653	0.16	71229	0.39	94487	0.45	2311	0.15		0.16
rhone_alps	35	1158	0.05	872	0.05	1158	0.05	1158	0.05	1158	0.05	872	0.04
tbed_ctct	84		17.68		13.51		20.79		41.93		24	1951443	8.01
tbed_nocoll	84		36.48		21.99		68.89		26.1		34.76	624389	2.33
tbed_noderail	84		30.96		23.25		68.58		15.12		51.52		30.31
verriegel4	65	1915	0.13	587	0.11	587	0.11	587	0.11	33118	0.34	587	0.11
profisafe_i4	80	17	0.07	17	0.07	39	0.09	24	0.07	63	0.09		0.07
profisafe_i4_host	28	12	0.05	12	0.05	34	0.08	12	0.04	58	0.07		0.05
profisafe_i4_slave	14	5	0.03	5	0.02	5			0.03	5	0.03	5	0.03
0 0 1 -							0.03	12					
profisafe_i5	88	24	0.09	17	0.08	39	0.12	24	0.09	63	0.11	17	0.08
profisafe_i5_host	88 28	24 12	$0.09 \\ 0.05$	17 12	$\begin{array}{c} 0.08 \\ 0.06 \end{array}$	39 34	$0.12 \\ 0.08$	24 12	$0.09 \\ 0.05$	63 58	0.09	12	0.06
profisafe_i5_host profisafe_i6	88 28 94	24 12 24	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \end{array}$	17 12 17	$\begin{array}{c} 0.08 \\ 0.06 \\ 0.09 \end{array}$	39 34 39	$\begin{array}{c} 0.12 \\ 0.08 \\ 0.12 \end{array}$	24 12 24	$0.09 \\ 0.05 \\ 0.11$	63 58 63	$0.09 \\ 0.12$	12 17	$\begin{array}{c} 0.06 \\ 0.09 \end{array}$
profisafe_i5_host profisafe_i6 profisafe_i6_host	88 28 94 28	24 12 24 12	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \end{array}$	17 12 17 12	$0.08 \\ 0.06 \\ 0.09 \\ 0.06$	39 34 39 34	$\begin{array}{c} 0.12 \\ 0.08 \\ 0.12 \\ 0.1 \end{array}$	24 12 24 12	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \end{array}$	63 58 63 58	$0.09 \\ 0.12 \\ 0.1$	12 17 12	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \end{array}$
profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host	88 28 94 28 78	24 12 24 12 22	$0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07$	17 12 17 12 76	$0.08 \\ 0.06 \\ 0.09 \\ 0.06 \\ 0.08$	39 34 39 34 34	$0.12 \\ 0.08 \\ 0.12 \\ 0.1 \\ 0.07$	24 12 24 12 32	$0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07$	63 58 63 58 333	$0.09 \\ 0.12 \\ 0.1 \\ 0.12$	12 17 12 24	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \\ 0.06 \end{array}$
profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host	88 28 94 28 78 84	24 12 24 12 22 15	$0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.06$	17 12 17 12 76 76	0.08 0.06 0.09 0.06 0.08 0.09	39 34 39 34 34 34	$\begin{array}{c} 0.12 \\ 0.08 \\ 0.12 \\ 0.1 \\ 0.07 \\ 0.09 \end{array}$	24 12 24 12 32 32	$0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.08$	63 58 63 58 333 333	$0.09 \\ 0.12 \\ 0.1 \\ 0.12 \\ 0.14$	12 17 12 24 24	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \\ 0.06 \\ 0.07 \end{array}$
profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave	88 28 94 28 78 84 84	24 12 24 12 22 15 22	$0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.06 \\ 0.07$	17 12 17 12 76 76 76	0.08 0.06 0.09 0.06 0.08 0.09 0.09	39 34 39 34 34 34 34	$\begin{array}{c} 0.12 \\ 0.08 \\ 0.12 \\ 0.1 \\ 0.07 \\ 0.09 \\ 0.09 \end{array}$	24 12 24 12 32 32 32	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.08 \end{array}$	63 58 63 58 333 333 333	$0.09 \\ 0.12 \\ 0.1 \\ 0.12 \\ 0.14 \\ 0.13$	$12 \\ 17 \\ 12 \\ 24 \\ 24 \\ 24 \\ 24$	$0.06 \\ 0.09 \\ 0.06 \\ 0.06 \\ 0.07 \\ 0.07$
profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4	88 28 94 28 78 84 84 90	24 12 24 12 22 15 22 17	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.06 \\ 0.07 \\ 0.08 \end{array}$	17 12 17 12 76 76 76 17	0.08 0.06 0.09 0.06 0.08 0.09 0.09 0.09 0.08	39 34 39 34 34 34 34 34 39	$\begin{array}{c} 0.12 \\ 0.08 \\ 0.12 \\ 0.1 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.1 \end{array}$	24 12 24 12 32 32 32 24	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.08 \end{array}$	63 58 63 333 333 333 333 63	$\begin{array}{c} 0.09 \\ 0.12 \\ 0.1 \\ 0.12 \\ 0.14 \\ 0.13 \\ 0.1 \end{array}$	$12 \\ 17 \\ 12 \\ 24 \\ 24 \\ 24 \\ 24 \\ 17$	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \\ 0.06 \\ 0.07 \\ 0.07 \\ 0.08 \end{array}$
profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave	88 28 94 28 78 84 84	24 12 24 12 22 15 22	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.05 \end{array}$	17 12 17 12 76 76 76 17 12	0.08 0.06 0.09 0.06 0.08 0.09 0.09 0.09 0.08	39 34 39 34 34 34 34 39 34	$\begin{array}{c} 0.12 \\ 0.08 \\ 0.12 \\ 0.1 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.1 \end{array}$	24 12 24 12 32 32 32 24 12	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.08 \end{array}$	63 58 63 333 333 333 63 58	$0.09 \\ 0.12 \\ 0.1 \\ 0.12 \\ 0.14 \\ 0.13$	12 17 12 24 24 24 17 12	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \\ 0.06 \\ 0.07 \\ 0.07 \\ 0.08 \end{array}$
profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4 profisafe_o4_host	88 28 94 28 78 84 84 90 30	24 12 24 12 22 15 22 17 12	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.05 \\ 0.03 \end{array}$	17 12 17 12 76 76 76 17 12	$\begin{array}{c} 0.08\\ 0.06\\ 0.09\\ 0.06\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.05\\ 0.03\\ \end{array}$	$39 \\ 34 \\ 39 \\ 34 \\ 34 \\ 34 \\ 39 \\ 34 \\ 39 \\ 34 \\ 5$	$\begin{array}{c} 0.12 \\ 0.08 \\ 0.12 \\ 0.1 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.07 \end{array}$	24 12 24 12 32 32 32 24 12 12	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.05 \end{array}$	63 58 63 333 333 333 63 58	$\begin{array}{c} 0.09 \\ 0.12 \\ 0.1 \\ 0.12 \\ 0.14 \\ 0.13 \\ 0.1 \\ 0.08 \end{array}$	$ \begin{array}{c} 12\\ 17\\ 12\\ 24\\ 24\\ 24\\ 17\\ 12\\ 5\end{array} $	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \\ 0.06 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.05 \end{array}$
profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_host profisafe_o4_slave	88 28 94 28 78 84 84 90 30 16	$\begin{array}{c} 24 \\ 12 \\ 24 \\ 12 \\ 22 \\ 15 \\ 22 \\ 17 \\ 12 \\ 5 \end{array}$	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.05 \\ 0.03 \end{array}$	17 12 17 12 76 76 76 76 17 12 5	$\begin{array}{c} 0.08\\ 0.06\\ 0.09\\ 0.06\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.05\\ 0.03\\ 0.09\end{array}$	$39 \\ 34 \\ 39 \\ 34 \\ 34 \\ 34 \\ 39 \\ 34 \\ 5 \\ 39 \\ 34 \\ 5 \\ 39 $	$\begin{array}{c} 0.12\\ 0.08\\ 0.12\\ 0.1\\ 0.07\\ 0.09\\ 0.09\\ 0.1\\ 0.07\\ 0.03\\ \end{array}$	24 12 24 12 32 32 32 24 12 12 24	$\begin{array}{c} 0.09 \\ 0.05 \\ 0.11 \\ 0.06 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.04 \end{array}$	63 58 63 333 333 333 63 58 58 5	$\begin{array}{c} 0.09 \\ 0.12 \\ 0.11 \\ 0.12 \\ 0.14 \\ 0.13 \\ 0.1 \\ 0.08 \\ 0.03 \end{array}$	$ \begin{array}{c} 12\\17\\24\\24\\24\\17\\12\\5\\17\end{array} $	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \\ 0.06 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.05 \\ 0.03 \end{array}$
profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4 profisafe_o4_host profisafe_o5	88 28 94 28 78 84 84 90 30 16 99	$\begin{array}{c} 24 \\ 12 \\ 24 \\ 12 \\ 22 \\ 15 \\ 22 \\ 17 \\ 12 \\ 5 \\ 17 \end{array}$	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.06\\ 0.07\\ 0.08\\ 0.05\\ 0.03\\ 0.08\\ \end{array}$	17 12 17 12 76 76 76 17 12 5 17	$\begin{array}{c} 0.08\\ 0.06\\ 0.09\\ 0.06\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.05\\ 0.03\\ 0.09\\ 0.06\end{array}$	$\begin{array}{c} 39\\ 34\\ 39\\ 34\\ 34\\ 34\\ 34\\ 39\\ 34\\ 5\\ 39\\ 34\\ 5\\ 39\\ 34\\ \end{array}$	$\begin{array}{c} 0.12\\ 0.08\\ 0.12\\ 0.1\\ 0.07\\ 0.09\\ 0.1\\ 0.07\\ 0.03\\ 0.12\\ 0.09 \end{array}$	$\begin{array}{c} 24 \\ 12 \\ 24 \\ 12 \\ 32 \\ 32 \\ 32 \\ 24 \\ 12 \\ 12 \\ 24 \\ 12 \end{array}$	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.08\\ 0.08\\ 0.08\\ 0.08\\ 0.05\\ 0.04\\ 0.1\end{array}$	$\begin{array}{c} 63\\ 58\\ 63\\ 333\\ 333\\ 333\\ 63\\ 58\\ 5\\ 63\\ 58\\ 58\\ 5\\ 63\\ 58\end{array}$	$\begin{array}{c} 0.09\\ 0.12\\ 0.12\\ 0.14\\ 0.13\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ \end{array}$	12 17 12 24 24 24 17 12 5 17 12	$\begin{array}{c} 0.06 \\ 0.09 \\ 0.06 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \end{array}$
profisafe_i5_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host	88 28 94 28 78 84 84 90 30 16 99 30 106 30	$\begin{array}{c} 24\\ 12\\ 24\\ 12\\ 22\\ 15\\ 22\\ 17\\ 12\\ 5\\ 17\\ 12\\ 12\\ \end{array}$	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.06\\ 0.07\\ 0.08\\ 0.05\\ 0.03\\ 0.08\\ 0.05\\ 0.1\\ 0.06\\ \end{array}$	17 12 17 12 76 76 76 17 12 5 17 12	$\begin{array}{c} 0.08\\ 0.06\\ 0.09\\ 0.06\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.05\\ 0.03\\ 0.09\\ 0.06\\ 0.1\\ 0.06\end{array}$	$\begin{array}{c} 39\\ 34\\ 39\\ 34\\ 34\\ 34\\ 34\\ 39\\ 34\\ 5\\ 39\\ 34\\ 5\\ 39\\ 34\\ \end{array}$	$\begin{array}{c} 0.12\\ 0.08\\ 0.12\\ 0.07\\ 0.09\\ 0.09\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\end{array}$	24 12 24 12 32 32 24 12 12 24 12 24 12 24	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.08\\ 0.08\\ 0.08\\ 0.05\\ 0.04\\ 0.11\\ 0.05\\ 0.12\\ 0.06\end{array}$	$\begin{array}{c} 63\\ 58\\ 63\\ 333\\ 333\\ 333\\ 63\\ 58\\ 5\\ 63\\ 58\\ 58\\ 5\\ 63\\ 58\end{array}$	$\begin{array}{c} 0.09\\ 0.12\\ 0.1\\ 0.12\\ 0.14\\ 0.13\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\\ \end{array}$	$ \begin{array}{c} 12\\ 17\\ 12\\ 24\\ 24\\ 17\\ 12\\ 5\\ 17\\ 12\\ 17\\ 12\\ 17\\ 12\\ 17\\ 12\\ 17\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12$	$\begin{array}{c} 0.06\\ 0.09\\ 0.06\\ 0.07\\ 0.07\\ 0.08\\ 0.05\\ 0.03\\ 0.09\\ 0.06\\ 0.1\\ 0.06\end{array}$
profisafe_i5_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host ftechnik	88 28 94 28 78 84 90 30 16 99 30 106 30 36	24 12 24 12 22 15 22 17 12 5 17 12 17 12 17	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.08\\ 0.05\\ 0.03\\ 0.08\\ 0.05\\ 0.1\\ 0.06\\ 54.51 \end{array}$	$17 \\ 12 \\ 17 \\ 12 \\ 76 \\ 76 \\ 76 \\ 17 \\ 12 \\ 5 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 17$	$\begin{array}{c} 0.08\\ 0.06\\ 0.09\\ 0.06\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.05\\ 0.03\\ 0.09\\ 0.06\\ 0.1\\ 0.06\\ 67.04 \end{array}$	39 34 39 34 34 34 39 34 5 39 34 39 34 35 39 34 35 39 34 34 39 34 34 34 34 39 34 34 34 39 34 34 39 34 34 39 34 34 39 34 34 39 34	$\begin{array}{c} 0.12\\ 0.08\\ 0.12\\ 0.1\\ 0.07\\ 0.09\\ 0.1\\ 0.07\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\\ 78.65 \end{array}$	24 12 24 12 32 32 24 12 12 24 12 24 12 24 12 383559	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.08\\ 0.08\\ 0.08\\ 0.05\\ 0.04\\ 0.11\\ 0.05\\ 0.12\\ \underline{0.06}\\ 100.32 \end{array}$	$\begin{array}{c} 63\\ 58\\ 63\\ 333\\ 333\\ 333\\ 63\\ 58\\ 5\\ 63\\ 58\\ 63\\ 63\\ 63\\ \end{array}$	$\begin{array}{c} 0.09\\ 0.12\\ 0.1\\ 0.12\\ 0.14\\ 0.13\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14 \end{array}$	$ \begin{array}{c} 12\\ 17\\ 12\\ 24\\ 24\\ 17\\ 12\\ 5\\ 17\\ 12\\ 17\\ 12\\ 17\\ 12\\ 17\\ 12\\ 17\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12\\ 12$	$\begin{array}{c} 0.06\\ 0.09\\ 0.06\\ 0.07\\ 0.07\\ 0.08\\ 0.05\\ 0.03\\ 0.09\\ 0.06\\ 0.1\\ 0.06\\ 1.92 \end{array}$
profisafe_i5_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host	88 28 94 28 78 84 84 90 30 16 99 30 106 30	24 12 24 12 22 15 22 17 12 5 17 12 17 12 17	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.06\\ 0.07\\ 0.08\\ 0.05\\ 0.03\\ 0.08\\ 0.05\\ 0.1\\ 0.06\\ \end{array}$	$17 \\ 12 \\ 17 \\ 12 \\ 76 \\ 76 \\ 76 \\ 17 \\ 12 \\ 5 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 17$	$\begin{array}{c} 0.08\\ 0.06\\ 0.09\\ 0.06\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.05\\ 0.03\\ 0.09\\ 0.06\\ 0.1\\ 0.06\end{array}$	39 34 39 34 34 34 34 39 34 5 39 34 39 34 39 34 39 34 39 34 34 39 34 34 39 34 34 39 34 34 39 34 34 39 34 34 39 34 34 39 34 34 39 39 34 39 39 39 310 39 310 39 310 39	$\begin{array}{c} 0.12\\ 0.08\\ 0.12\\ 0.07\\ 0.09\\ 0.09\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\end{array}$	24 12 24 32 32 24 12 12 24 12 24 12 24 12 24 12 24	$\begin{array}{c} 0.09\\ 0.05\\ 0.11\\ 0.06\\ 0.07\\ 0.08\\ 0.08\\ 0.08\\ 0.05\\ 0.04\\ 0.11\\ 0.05\\ 0.12\\ 0.06\end{array}$	$\begin{array}{c} 63\\ 58\\ 63\\ 333\\ 333\\ 333\\ 63\\ 58\\ 5\\ 63\\ 58\\ 63\\ 58\\ 63\\ 58\\ 58\\ 58\\ 58\\ 58\\ 58\\ 58\\ 63\\ 58\\ 58\\ 63\\ 58\\ 58\\ 58\\ 58\\ 58\\ 58\\ 58\\ 58\\ 58\\ 58$	$\begin{array}{c} 0.09\\ 0.12\\ 0.1\\ 0.12\\ 0.14\\ 0.13\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\\ \end{array}$	12 17 12 24 24 24 17 12 5 17 12 17 12 17 12	$\begin{array}{c} 0.06\\ 0.09\\ 0.06\\ 0.07\\ 0.07\\ 0.08\\ 0.05\\ 0.03\\ 0.09\\ 0.06\\ 0.1\\ 0.06\end{array}$

Table 3.6 MODULAR CONTROLLABILITY CHECK NOT PREFERRING PLANTS, LARGEST CONTROLLER FIRST

Table 3.7
MODULAR CONTROLLABILITY CHECK PREFERRING PLANTS, SMALLEST
CONTROLLER FIRST

Model			Mod	lular con	trolla	bility, pro	eferrin	g plants,	small	est con	troller	first	
		All		Earl	у	Lat	е	MaxCor	nmon	MaxCo	ommon	Ma	x
				NotAc	$\operatorname{cept}$	NotAc	$_{\rm cept}$	Even	ıts	Unc	ontr	Stat	es
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	393	0.06	407	0.06	403	0.06	403	0.06	161	0.05	407	0.05
fzelle	67	9951	0.19	14748	0.3	6267	0.24	4168	0.19	4470	0.18	4485	0.2
rhone_alps	35	308992	1.21	1066042	4.9	12031	0.08	8951	0.08		0.08	8951	0.08
tbed_ctct	84	119806	0.41	18391	0.13		22.37	18391	0.12	22298	0.14		33.73
tbed_nocoll	84		21.96		51.91		28.94		31.32		31.56		67.33
tbed_noderail	84		22.56		52.58		36.26		32.11		32.2		46.26
verriegel4	65	21271	0.2	25219	0.25	519	0.09	1165	0.1	12497	0.19	33306	0.35
profisafe_i4	80	41	0.09	51	0.1	38	0.09	24	0.07	48	0.09	48	0.09
profisafe_i4_host	28	33	0.06	39	0.07	33	0.06	19	0.05	43	0.07	43	0.07
profisafe_i4_slave	14	8	0.03	12	0.03	5	0.03	5	0.03	5	0.03	5	0.02
profisafe_i5	88	41	0.1	51	0.11	38	0.1	24	0.08	48	0.11	48	0.11
profisafe_i5_host	28	33	0.07	39	0.08	33	0.07	19	0.06	43	0.08	43	0.08
profisafe_i6	94	41	0.12	51	0.13	38	0.37	24	0.09	48	0.12	48	0.12
profisafe_i6_host	28	33	0.08	39	0.1	33	0.08	19	0.07	43	0.1	43	0.1
profisafe_inclusion_i4host	78	94	0.08	139	0.1	32	0.07	37	0.07	195	0.11	253	0.13
profisafe_inclusion_o4host	84	94	0.09	139	0.1	32	0.08	37	0.08	195	0.13	253	0.14
profisafe_inclusion_o4slave	84	94	0.09	139	0.1	32	0.07	37	0.08	195	0.13	253	0.14
profisafe_04	90	41	0.1	51	0.11	38	0.09	24	0.08	48	0.1	48	0.1
profisafe_04_host	30	33	0.06	39	0.07	33	0.06	19	0.05	43	0.07	43	0.07
profisafe_o4_slave	16	8	0.04	12	0.04	5	0.03	5	0.03	5	0.03	5	0.03
profisafe_o5	99	41	0.11	51	0.13	38	0.11	24	0.09	48	0.12	48	0.12
profisafe_o5_host	30	33	0.07	39	0.09	33	0.07	19	0.06	43	0.08	43	0.08
profisafe_06	106	41	0.13	51	0.14	38	0.13	24	0.11	48	0.13	48	0.14
profisafe_o6_host	30	33	0.09	39	0.1	33	0.08	19	0.07	43	0.1	43	0.09
ftechnik	36	1663577	12.28	4180499	30.49		16.03	5511458	39.84		37.44		27.89
rhone_tough	61		10.45		9.82		13.31		8.47		8.9		10.2
rnone_tougn	01				0.00-								
tbed_uncont	84		21.84		51.95		28.88		31.42		31.55		67.22
0		Mii	21.84 1	Mir	51.95 1	Mii	28.88 1	Mir	31.42 1	0		RelM	67.22 ax
tbed_uncont Model	84	Even	21.84 n its	NewEv	51.95 1 ents	Stat	28.88 1 es	Transit	31.42 n ions		31.55 ne	Comn	67.22 lax non
tbed_uncont Model Name	84 Aut	Even States	21.84 n ts Time	NewEv States	51.95 1 rents Time	Stat States	28.88 n es Time	Transit States	31.42 n tions Time	States	31.55 ne Time	Comn States	67.22 ax non Time
tbed_uncont Model Name big_bmw	84 Aut 31	Even States 161	21.84 n ts Time 0.05	NewEv States 161	51.95 rents Time 0.04	Stat States 161	28.88 n es Time 0.05	Transit States 161	31.42 n tions Time 0.04	States 363	31.55 ne Time 0.05	Comn States 161	67.22 ax non Time 0.05
tbed_uncont Model Name big_bmw fzelle	84 Aut 31 67	Even States 161 7132	21.84 n ts <u>Time</u> 0.05 0.23	NewEv States 161 4936	51.95 rents Time 0.04 0.19	Stat States 161 13670	28.88 n es <u>Time</u> 0.05 0.27	Transit States 161 14470	31.42 ions <u>Time</u> 0.04 0.27	States 363 4722	31.55 ne Time 0.05 0.18	Comn States 161 5059	67.22 ax non Time 0.05 0.19
tbed_uncont Model Name big_bmw fzelle rhone_alps	84 Aut 31 67 35	Even States 161	21.84 n Time 0.05 0.23 0.07	NewEv States 161	51.95 n rents Time 0.04 0.19 0.04	Stat States 161	28.88 n es 0.05 0.27 1.25	Transit States 161	31.42 n ions <u>Time</u> 0.04 0.27 1.25	States 363	31.55 ne Time 0.05 0.18 0.08	Comn States 161 5059 986	67.22 ax non 0.05 0.19 0.04
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct	Aut 31 67 35 84	Even States 161 7132	21.84 n Time 0.05 0.23 0.07 15.85	NewEv States 161 4936	51.95 rents 0.04 0.19 0.04 32.01	Stat States 161 13670	28.88 n es 0.05 0.27 1.25 34.52	Transit States 161 14470	31.42 ions <u>Time</u> 0.04 0.27 1.25 11.31	States 363 4722	31.55 ne <u>Time</u> 0.05 0.18 0.08 25.75	Comn States 161 5059	67.22 ax non Time 0.05 0.19 0.04 7.55
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll	Aut 31 67 35 84 84	Even States 161 7132	21.84 n tts 0.05 0.23 0.07 15.85 23.52	NewEv States 161 4936	51.95 ents Time 0.04 0.19 0.04 32.01 14.13	Stat States 161 13670	28.88 n es 0.05 0.27 1.25 34.52 58.24	Transit States 161 14470	31.42 ions <u>Time</u> 0.04 0.27 1.25 11.31 37.08	States 363 4722	31.55 ne 0.05 0.18 0.08 25.75 20.73	Comn States 161 5059 986	67.22 ax non <u>Time</u> 0.05 0.19 0.04 7.55 31.42
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail	Aut 31 67 35 84 84 84	Even States 161 7132 12029	21.84 h tts Time 0.05 0.23 0.07 15.85 23.52 23.02	NewEv States 161 4936 986	51.95 rents Time 0.04 0.19 0.04 32.01 14.13 14.31	Stat States 161 13670 320169	28.88 <sup>1</sup> es <u>Time</u> 0.05 0.27 1.25 34.52 58.24 58.57	Transit States 161 14470 320169	31.42 ions <u>Time</u> 0.04 0.27 1.25 11.31 37.08 46.31	States 363 4722 12029	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95	Comn States 161 5059 986 1951443	67.22 ax non Time 0.05 0.19 0.04 7.55 31.42 32.03
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4	Aut 31 67 35 84 84 84 65	Even States 161 7132 12029 1933	21.84 n Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14	NewEv States 161 4936 986 597	51.95 rents Time 0.04 0.19 0.04 32.01 14.13 14.31 0.1	States 161 13670 320169 597	28.88 <sup>1</sup> es <u>Time</u> 0.05 0.27 1.25 34.52 58.24 58.57 0.11	Transit States 161 14470 320169 597	31.42 ions <u>Time</u> 0.04 0.27 1.25 11.31 37.08 46.31 0.1	States 363 4722 12029 33136	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34	Comn States 161 5059 986 1951443 485	67.22 iax non 0.05 0.19 0.04 7.55 31.42 32.03 0.09
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4	84 Aut 31 67 35 84 84 84 65 80	Even States 161 7132 12029 1933 24	21.84 a tts Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07	NewEv States 161 4936 986 597 24	51.95 ents Time 0.04 0.19 0.04 32.01 14.13 14.31 0.1 0.07	States 161 13670 320169 597 54	28.88 n es Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.1	Transit States 161 14470 320169 597 31	31.42 ions Time 0.04 0.27 1.25 11.31 37.08 46.31 0.1 0.08	States 363 4722 12029 33136 48	31.55 ne 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09	Comn States 161 5059 986 1951443 485 24	67.22 ax non <u>Time</u> 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host	84 Aut 31 67 35 84 84 84 65 80 28	Even States 161 7132 12029 1933 24 19	21.84 a Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05	NewEv States 161 4936 986 597 24 19	51.95 ents Time 0.04 0.19 0.04 32.01 14.13 14.31 0.1 0.07 0.05	States 161 13670 320169 597 54 49	28.88 es 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.1 0.08	Transit States 161 14470 320169 597 31 19	31.42 ions Time 0.04 0.27 1.25 11.31 37.08 46.31 0.1 0.08 0.06	States 363 4722 12029 33136 48 43	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07	Comn States 161 5059 986 1951443 485 24 19	67.22 ax non 7ime 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocell tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave	Aut           31           67           35           84           84           84           84           84           84           84           84           84           84           84           84           84           81           82           81           82           81           82           83           84           84           85           80           28           14	Even States 161 7132 12029 1933 24 19 5	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03	NewEv States 161 4936 986 597 24 19 5	51.95 ents Time 0.04 0.19 0.04 32.01 14.13 14.31 0.1 0.07 0.05 0.03	States           161           13670           320169           597           54           49           5	28.88 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.1 0.08 0.03	Transit States 161 14470 320169 597 31 19 12	31.42 ions Time 0.04 0.27 1.25 11.31 37.08 46.31 0.1 0.08 0.06 0.03	States 363 4722 12029 33136 48 43 5	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02	Comn States 161 5059 986 1951443 485 24 19 5	67.22 iax non 7ime 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5	84 Aut 31 67 35 84 84 84 65 80 28 14 88	Even States 161 7132 12029 1933 24 19 5 31	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03 0.09	NewEv States 161 4936 986 597 24 19 5 24	51.95 ents Time 0.04 0.19 0.04 32.01 14.13 14.31 0.1 0.07 0.05 0.03 0.08	State           161           13670           320169           597           54           49           5           54	28.88 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.1 0.08 0.03 0.12	Transit States 161 14470 320169 597 31 19 12 31	31.42 ions Time 0.04 0.27 1.25 11.31 37.08 46.31 0.1 0.08 0.06 0.03 0.09	States           363           4722           12029           33136           48           43           5           48	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11	Comn <u>States</u> 161 5059 986 1951443 485 24 19 5 24	67.22 ax non Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08
tbed_uncont Model Name big.bmw fzelle rhone.alps tbed_ctct tbed_nocell tbed_noderail verriegel4 profisafe.i4_host profisafe.i4_slave profisafe.i5 profisafe.i5_profisafe.i5_host	84 Aut 31 67 35 84 84 84 65 80 28 14 88 28	Even States 161 7132 12029 1933 24 19 5 31 19	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03 0.09 0.06	NewEv States 161 4936 986 597 24 19 5 24 19	51.95 ents Time 0.04 0.19 0.04 32.01 14.13 14.31 0.17 0.05 0.03 0.08 0.06	Stat States 161 13670 320169 597 54 49 5 54 49	28.88 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.08 0.03 0.12 0.1	Transit States 161 14470 320169 597 31 19 12 31 19	31.42 Time 0.04 0.27 1.25 11.31 37.08 46.31 0.1 0.08 0.06 0.03 0.09 0.06	States           363           4722           12029           33136           48           43           5           48           43	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08	Comn States 161 5059 986 1951443 485 24 195 5 24 19	67.22 ax 100 Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08 0.06
tbed_uncont Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_profisafe_i5_host profisafe_i6	84 Aut 31 67 35 84 84 84 84 85 80 28 14 88 28 94	Ever States 161 7132 12029 1933 24 19 5 31 19 31	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03 0.09 0.06 0.1	NewEv States 161 4936 986 597 24 19 5 244 19 24	51.95 ents Time 0.04 0.19 0.04 32.01 14.13 14.31 0.1 0.07 0.05 0.03 0.08 0.06 0.09	States 161 13670 320169 597 54 49 54 49 54 49 54 49 54	28.88 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.18 0.03 0.12 0.14	Transit States 161 14470 320169 597 31 19 12 31 19 31	31.42 Time 0.04 0.27 1.25 11.31 37.08 46.31 0.1 0.08 0.06 0.03 0.09 0.06 0.11	States         363           34722         12029           33136         48           43         5           48         43           43         48           43         48	31.55 ne 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08 0.12	Comm States 161 5059 986 1951443 485 24 19 5 24 19 24	67.22 ax 100 Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08 0.08 0.06 0.09
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i6 profisafe_i6_host	84 31 67 35 84 84 84 65 80 28 14 88 28 94 28	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03 0.09 0.06 0.1 0.07	NewEv States 161 4936 986 597 24 19 5 24 19 24 19 24	51.95 1 Time 0.04 0.19 0.04 32.01 14.13 14.31 0.17 0.05 0.03 0.08 0.06 0.09 0.07	States 161 13670 320169 597 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 54 54 54 54 54 54 54 54 54	28.88 1 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.18 0.03 0.12 0.14 0.14 0.11	Transit States 161 14470 320169 597 31 19 12 31 19 31 19	31.42 Time 0.04 0.27 1.25 11.31 37.08 46.31 0.18 0.06 0.03 0.09 0.06 0.11 0.07	States           363           4722           12029           33136           48           43           5           48           43           48           43           48           43	31.55 ne 75 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.02 0.12 0.09	Comm States 161 5059 986 1951443 485 24 19 5 24 19 24 19 24	67.22 ax 100 1005 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08 0.08 0.09 0.07
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_i6_host	84           31           67           35           84           84           65           80           28           14           88           28           94           28           78	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 29	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03 0.09 0.06 0.1 0.07 0.07	NewEv States 161 4936 986 597 24 19 5 24 19 24 19 24 19 83	51.95 1 Time 0.04 0.19 0.04 32.01 14.13 14.31 0.17 0.05 0.03 0.08 0.06 0.09 0.07 0.08	States           161           13670           320169           597           54           49           5           54           49           54           49           54           49           54           49           49           54           49           54           49           54           49           54           49           54           49           54           49           54	28.88 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.08 0.03 0.12 0.14 0.14 0.11 0.09	Transit States 161 14470 320169 597 31 19 12 31 19 31 19 31 19 31 19 47	31.42 ions Time 0.04 0.27 1.25 11.31 37.08 46.31 0.11 0.08 0.06 0.03 0.09 0.06 0.11 0.07 0.08	States           363           4722           12029           33136           48           43           5           48           43           43           252	31.55 ne 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08 0.12	Comm States 161 5059 986 1951443 485 24 19 5 24 19 24 19 24 19 24 19 31	67.22 ax Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08 0.06 0.09 0.07 0.05
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocell tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	84 Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 29 22	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03 0.09 0.06 0.11 0.07 0.07 0.07	NewEv States 161 4936 986 597 24 19 5 24 19 24 19 24 19 83 83	51.95 a ents Time 0.04 0.19 0.04 32.01 14.13 14.13 14.31 0.07 0.05 0.03 0.08 0.06 0.09 0.07 0.08 0.09	States           161           13670           320169           597           54           49           54           49           49           49           49           49           49           49           49           49           49	28.88 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.08 0.03 0.12 0.11 0.14 0.11 0.09 0.09	Transit States 161 14470 320169 597 31 19 12 31 19 31 19 47 47	31.42 ions Time 0.04 0.27 1.25 11.31 37.08 46.31 0.18 0.06 0.03 0.09 0.06 0.11 0.07 0.08 0.07 0.08 0.07 0.08 0.09 0.06 0.01 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.01 0.09 0.09 0.06 0.01 0.07 0.08 0.09 0.06 0.01 0.08 0.09 0.06 0.01 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.06 0.01 0.09 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.09 0.06 0.07 0.08 0.07 0.08 0.09 0.08 0.09 0.09 0.09 0.08 0.09 0.08 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.08 0.09	States           363           4722           12029           33136           48           43           5           48           43           252           252	31.55 ne 0.05 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08 0.12 0.09 0.12 0.12	Comm States 161 5059 986 1951443 485 24 19 5 24 19 24 19 24 19 31	67.22 ax Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08 0.08 0.09 0.07 0.05 0.03 0.08 0.09 0.07 0.05
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5 profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave	84 Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84 84 84 85 80 88 88 88 88 88 88 88 88 88	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 29 22 29	21.84 Time 0.05 0.23 0.07 15.85 23.52 23.02 0.14 0.07 0.05 0.03 0.09 0.06 0.1 0.07 0.07 0.07 0.07 0.07	NewEv States 161 4936 986 597 24 19 5 24 19 24 19 24 19 83 83 83	$\begin{array}{c} 51.95\\ 1\\ \hline \\ ents\\ \hline \\ \hline \\ 1\\ \hline \\ ents\\ \hline \\ 0.04\\ 0.04\\ 0.04\\ 0.04\\ 0.04\\ 0.04\\ 0.04\\ 0.05\\ 0.03\\ 0.08\\ 0.06\\ 0.09\\ 0.07\\ 0.08\\ 0.09\\ 0.00\\ 0.09\\ 0.00\\ 0.00\\ 0.00\\ 0.$	States           161           13670           320169           597           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           49           49           49           49           49           49           49           49           49           49           49           49           54           54           54           54           54           55           54           54           55           54           55           56           57           58           59           59           50	28.88 Time 0.05 0.27 1.25 34.52 58.24 58.57 0.11 0.18 0.03 0.12 0.11 0.14 0.14 0.19 0.09 0.09	Transit States 161 14470 320169 597 31 19 12 31 19 31 19 31 19 47 47 47	31.42 ions Time 0.04 0.27 1.25 11.31 37.08 46.31 0.18 0.06 0.03 0.09 0.06 0.11 0.07 0.08 0.09 0.09 0.09	States           363           4722           12029           33136           48           43           5           48           43           252           252           252	31.55 ne 0.05 0.18 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08 0.12 0.09 0.12 0.14 0.14	Comm States 161 5059 986 1951443 485 24 19 5 24 19 24 19 24 19 31 31 31	67.22 ax Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.05 0.05 0.03 0.05 0.03 0.08 0.06 0.09 0.07 0.07 0.08 0.08
Model           Name           big.bmw           fzelle           rhone_alps           tbed_ctct           tbed_nocoll           tbed_noderail           verriegel4           profisafe_i4_slave           profisafe_i5_           profisafe_i6_nost           profisafe_i6_host           profisafe_inclusion_i4host           profisafe_inclusion_o4host           profisafe_o4	84 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84 90	Ever States 161 7132 12029 1933 24 19 31 19 31 19 31 19 31 19 22 29 24	$\begin{array}{c} 21.84\\ \hline \\ 1\\ \hline \\ \\ \hline \\ \\ 1\\ \hline \\ \\ \\ \\ \\ \\ \\ $	NewEv States 161 4936 986 597 24 19 5 24 19 24 19 24 19 83 83 83 83	$\begin{array}{c} 51.95\\ \hline \\ & \text{ents}\\ \hline \\ \hline \\ \hline \\ & \text{mens}\\ \hline \\ & 0.04\\ 0.19\\ 0.04\\ 32.01\\ 14.13\\ 0.1\\ 14.13\\ 14.31\\ 0.1\\ 0.05\\ 0.03\\ 0.00\\ 0.03\\ 0.00\\ 0.00\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.08\\ 0.09\\ $	States           161           13670           320169           597           54           49           54           49           54           49           54           49           54           54           54           49           54           54           54           54           55           54	$\begin{array}{c} 28.88 \\ \hline \\ 88 \\ \hline \\ \hline \\ 88 \\ \hline \\ \hline \\ 0.05 \\ 0.27 \\ 1.25 \\ 34.52 \\ 58.24 \\ 58.57 \\ 0.11 \\ 0.18 \\ 0.03 \\ 0.03 \\ 0.12 \\ 0.11 \\ 0.04 \\ 0.01 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.011 \end{array}$	Transit States 161 14470 320169 597 31 19 12 31 19 31 19 47 47 47 31	$\begin{array}{c} 31.422\\ \hline \\ 1\\ \hline \\ 1\\ \hline \\ 1\\ \hline \\ 0.08\\ 0.27\\ 1.25\\ 11.31\\ 0.1\\ 0.27\\ 1.25\\ 11.31\\ 0.1\\ 0.27\\ 0.08\\ 0.00\\ 0.$	States           363           4722           12029           33136           48           43           5           48           43           252           252           252           252           48	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08 0.12 0.09 0.12 0.14 0.14 0.1	Comm States 161 5059 986 1951443 485 24 19 5 24 19 24 19 24 19 31 31 31 24	67.22 ax Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08 0.08 0.06 0.09 0.07 0.07 0.05 0.03 0.08 0.08 0.08 0.08
tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_bost profisafe_i5_bost profisafe_i5_bost profisafe_i6_bost profisafe_i6_bost profisafe_inclusion_o4host profisafe_o4_bost	84 31 67 35 84 84 84 65 80 28 14 88 28 94 28 84 84 90 30	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 22 29 29 24 19	$\begin{array}{c} 21.84\\ \hline \\ 1\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	NewEv States 161 4936 986 597 24 19 5 24 19 24 19 24 19 83 83 83 83 83 83	$\begin{array}{c} 51.95\\ \hline \\ 1\\ \hline \\ ents\\ \hline \\ 0.04\\ 0.04\\ 32.01\\ 14.13\\ 14.31\\ 0.1\\ 0.07\\ 0.05\\ 0.03\\ 0.08\\ 0.06\\ 0.09\\ 0.07\\ 0.08\\ 0.09\\ 0.09\\ 0.08\\ 0.09\\ 0.08\\ 0.05\\ \hline \end{array}$	States           161           13670           320169           597           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           49           49           54           49           54           49           54           49           54           54           54           136           136           136           136           147           148           149           54           54           54 </td <td>28.88 Time s 0.055 0.27 1.25 58.24 58.24 58.57 0.11 0.08 0.03 0.12 0.11 0.09 0.09 0.09 0.09 0.01 0.01 0.19 0.11 0.05 0.03 0.12 0.12 0.12 0.12 0.12 0.27 0.12 0.27 0.12 0.27 0.12 0.27 0.12 0.27 0.11 0.08 0.03 0.12 0.12 0.09 0.01 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.11 0.11 0.12 0.11 0.12 0.12 0.11 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.01 0.09 0.01 0.09 0.09 0.01 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.01 0.09 0.00</td> <td>Transit States 161 14470 320169 597 31 19 12 31 19 31 19 47 47 47 47 19 19</td> <td><math display="block">\begin{array}{c} 31.422\\ \hline 31.42\\ \hline 1\\ \hline 0.08\\ \hline 0.027\\ 1.25\\ 11.31\\ 37.08\\ 46.31\\ 0.1\\ 0.08\\ 0.06\\ 0.03\\ 0.09\\ 0.06\\ 0.09\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ 0.00\\ </math></td> <td>States           363           4722           12029           33136           48           43           5           48           43           252           252           252           48           43           48           43           48           43           48           43           48           43           48           43           48           43           48           43           48           43           252           252           48           43</td> <td>31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08 0.12 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tbed_uncont Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_bost profisafe_i5_bost profisafe_i5_bost profisafe_i6_bost profisafe_inclusion_i4host profisafe_inclusion_i4host profisafe_o4_profisafe_o4_slave profisafe_o4_bost profisafe_o5_bost profisafe_o5_host profisafe_o6_profisafe_o6_bost	84 Aut 31 67 35 84 84 84 85 28 14 88 28 94 28 94 28 94 84 84 90 30 106 30	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 22 29 24 19 5 5 24 19 9 22 29 24	$\begin{array}{c} 21.84\\ \hline 21.84\\ \hline \\ \\ \hline \\ \\ \hline \\$	NewEv States 161 4936 986 597 24 19 24 19 24 19 83 83 83 24 19 5 24 19 24	$\begin{array}{c} 51.95\\ \hline \\ 1\\ \hline \\ rents\\ \hline \\ 0.04\\ 0.09\\ 0.04\\ 32.01\\ 14.13\\ 14.31\\ 0.1\\ 0.07\\ 0.05\\ 0.03\\ 0.08\\ 0.09\\ 0.07\\ 0.08\\ 0.09\\ 0.008\\ 0.09\\ 0.008\\ 0.09\\ 0.008\\ 0.008\\ 0.009\\ 0.008\\ 0.009\\ 0.008\\ 0.009\\ 0.008\\ 0.008\\ 0.009\\ 0.008\\ 0.008\\ 0.009\\ 0.008\\ 0.008\\ 0.008\\ 0.009\\ 0.008\\ 0.$	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ 161 \\ 13670 \\ 320169 \\ \hline 597 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 499 \\ 499 \\ 499 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 499 \\ 3465198 \\ \hline \end{array}$	28.88 Time es 0.055 0.27 1.25 58.24 58.24 0.11 0.14 0.12 0.14 0.09 0.09 0.09 0.09 0.09 0.011 0.09 0.01 0.11 0.05 0.11 0.15 0.11 0.15 0.11 0.15 0.11 0.15 0.11 0.15 0.12 0.15 0.12 0.15 0.27 0.27 1.25 58.24 0.11 0.12 0.09 0.09 0.09 0.01 0.09 0.01 0.	Transit <u>States</u> 161 14470 320169 597 31 199 122 31 199 477 477 477 477 31 199 122 31 199 31 199 122 31 199 190 190 190 190 190 190 19	$\begin{array}{c} 31.422\\ \hline 31.42\\ \hline 1\\ \hline \\ 1\\ \hline \\ 1\\ \hline \\ 0.08\\ \hline \\ 0.027\\ \hline \\ 1.25\\ \hline \\ 1.31\\ \hline \\ 0.07\\ \hline \\ 37.08\\ \hline \\ 46.31\\ \hline \\ 0.12\\ \hline \\ 0.08\\ \hline \\ 0.09\\ \hline \\ 0.00\\ \hline 0.00$	States           363           4722           12029           33136           48           43           5           48           43           252           252           252           252           48           43           5           48           43           43           43           44           43           48           43           48           43           48           43           48           43	31.55 ne Time 0.05 0.18 0.08 25.75 20.73 40.95 0.34 0.09 0.07 0.02 0.11 0.08 0.12 0.09 0.12 0.14 0.14 0.14 0.14 0.13 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.04 0.12 0.04 0.12 0.05 0.12 0.14 0.12 0.05 0.12 0.14 0.12 0.14 0.12 0.12 0.14 0.12 0.14 0.12 0.14 0.14 0.12 0.15 0.14 0.12 0.14 0.12 0.14 0.12 0.14 0.14 0.12 0.14 0.12 0.14 0.12 0.14 0.14 0.14 0.12 0.14 0.15 0.15 0.14 0.14 0.14 0.14 0.12 0.03 0.12 0.14 0.14 0.14 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.12 0.03 0.13 0.09 0.13 0.09 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15	$\begin{array}{r} \hline \text{Comm} \\ \hline \text{States} \\ \hline 161 \\ 5059 \\ 986 \\ 1951443 \\ \hline 485 \\ 24 \\ 199 \\ 5 \\ 24 \\ 19 \\ 311 \\ 311 \\ 311 \\ 311 \\ 311 \\ 24 \\ 199 \\ 5 \\ 24 \\ 199 \\ 24 \\ 19 \\ 19 \\ 24 \\ 19 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 19 \\ 24 \\ 19 \\ 19 \\ 24 \\ 19 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$	67.22 ax Time 0.05 0.19 0.04 7.55 31.42 32.03 0.09 0.07 0.05 0.03 0.08 0.06 0.09 0.07 0.07 0.07 0.08 0.08 0.08 0.08 0.09 0.07 0.05 0.03 0.09 0.07 0.07 0.05 0.03 0.09 0.03 0.09 0.05 0.03 0.09 0.05 0.03 0.09 0.05 0.03 0.09 0.05 0.03 0.03 0.09 0.05 0.03 0.09 0.05 0.03 0.09 0.05 0.03 0.09 0.05 0.03 0.09 0.05 0.03 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.007 0.00

Model			Modu			ility, not	prefe			argest co			
		Al	1	Earl	0	Lat				MaxCor			
				NotAc		NotAd		Eve	-	Unco		State	
Name	Aut	States	Time	States	Time	States		States	Time	States	Time		Time
big_bmw	31	1728	0.05	407	0.05	403	0.04		0.05	161	0.04	8758	0.09
fzelle	67	7719	0.14	29194	0.28	3652	0.18		0.13		0.13		0.12
rhone_alps	35	225231	0.89		4.91	12031	0.07		0.07	12161	0.1	9849	0.08
tbed_ctct	84	119806	0.4	18391	0.13		22.21		0.13		0.14		33.77
tbed_nocoll	84		25.71		57.07			613031		1754041	6.91		25.44
tbed_noderail	84		25.89		56.73		72.4			1775027	7.08		23.46
verriegel4	65		19.44	24576	0.28	519	0.1		0.29	12497	0.2	32773	0.38
profisafe_i4	80	56	0.09	124	0.12	38	0.08		0.07	48	0.1	41	0.07
profisafe_i4_host	28	48	0.06	112	0.09	33	0.06		0.05	43	0.08	36	0.05
profisafe_i4_slave	14	8	0.03	12	0.03	5	0.03		0.03		0.03		0.02
profisafe_i5	88	56	0.1	124	0.14	38	0.1	41	0.09	48	0.11	41	0.08
profisafe_i5_host	28	48	0.08	112	0.1	33	0.07				0.09	36	0.07
profisafe_i6	94	56	0.12	124	0.16	38	0.11	41	0.1	48	0.13		0.11
profisafe_i6_host	28	48	0.08	112	0.12	33	0.08		0.07		0.1	36	0.07
profisafe_inclusion_i4host	78	184	0.08	143	0.1	32	0.07	66	0.07	195	0.12	130	0.08
profisafe_inclusion_o4host	84	184	0.09	143	0.1	32	0.08	66	0.08	195	0.13	130	0.09
*	84	184	0.09	143	0.1	32	0.08	66	0.08	195	0.13		0.09
profisafe_04	90	56	0.1	124	0.13	38	0.09		0.08	48	0.1	41	0.08
profisafe_o4_host	30	48	0.06	112	0.09	33	0.07				0.07	36	0.05
profisafe_o4_slave	16	8	0.04	12	0.04	5	0.03		0.03		0.03		0.03
profisafe_o5	99	56	0.11	124	0.15	38	0.11	41	0.1	48	0.13	41	0.1
profisafe_o5_host	30	48	0.07	112	0.1	33	0.07		0.06		0.09	36	0.06
profisafe_06	106	56	0.13	124	0.17	38	0.13		0.12	48	0.14	41	0.12
profisafe_o6_host	30	48	0.08	112	0.11	33	0.08				0.1	36	0.07
ftechnik	36	159004	1.23	21063	0.16	128	0.04	128	0.03	128		336808	1.11
rhone_tough	61		11.39		15.75		15.89		11.14		33.37		14.58
tbed_uncont	84		25.69		56.48		21.05		30.72		54.33		77.84
Model		Mi Ever		Mir NewEv		Mi Stat		Mi Transi		One	е	RelM Comm	
	Δ 11†	Ever	nts	NewEv	ents	Stat	es	Transi	itions			Comm	non
Name	Aut	Ever States	nts Time	NewEv States	ents Time	Stat States	es Time	Transi States	itions Time	States	Time	Comm States	non Time
Name big_bmw	31	Ever States 161	nts Time 0.04	NewEv States 161	rents Time 0.04	Stat States 161	Time 0.04	Transi States 161	itions Time 0.04	States 363	Time 0.04	Comm States 161	non Time 0.04
Name big_bmw fzelle	31 67	Even States 161 7132	nts Time 0.04 0.24	NewEv States 161 2765	rents Time 0.04 0.14	States 161 30054	Time 0.04 0.29	Transi States 161 30731	Time 0.04 0.3	States 363 4722	Time 0.04 0.16	Comm States 161 2609	non Time 0.04 0.13
Name big_bmw fzelle rhone_alps	31 67 35	Ever States 161	Time 0.04 0.24 0.08	NewEv States 161	Time 0.04 0.14 0.04	Stat States 161	Time 0.04 0.29 1.25	Transi States 161 30731 320169	Time 0.04 0.3 1.25	States 363 4722	Time 0.04 0.16 0.08	Comm States 161 2609 986	non Time 0.04 0.13 0.04
Name big.bmw fzelle rhone_alps tbed_ctct	31 67 35 84	Even States 161 7132	nts <u>Time</u> 0.04 0.24 0.08 15.77	NewEv States 161 2765	rents Time 0.04 0.14 0.04 31.76	States 161 30054	Time 0.04 0.29 1.25 34.19	Transi States 161 30731 320169	tions Time 0.04 0.3 1.25 11.25	States 363 4722 12029	Time 0.04 0.16 0.08 25.68	Comm States 161 2609 986 1951443	non Time 0.04 0.13 0.04 7.52
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll	31 67 35 84 84	Even States 161 7132	nts <u>Time</u> 0.04 0.24 0.08 15.77 20.02	NewEv States 161 2765	Time 0.04 0.14 0.04 31.76 14.17	States 161 30054	Time 0.04 0.29 1.25 34.19 60.31	Transi States 161 30731 320169	tions Time 0.04 0.3 1.25 11.25 20	States 363 4722 12029	Time 0.04 0.16 0.08 25.68 20.78	Comm States 161 2609 986 1951443 581749	Time 0.04 0.13 0.04 7.52 2.25
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail	31 67 35 84 84 84	Even States 161 7132 12029	Time 0.04 0.24 0.08 15.77 20.02 22.94	NewEv States 161 2765 986	Time 0.04 0.14 0.04 31.76 14.17 29.46	Stat States 161 30054 320169	Time 0.04 0.29 1.25 34.19 60.31 60.34	Transi States 161 30731 320169	Time 0.04 0.3 1.25 11.25 20 36.01	States 363 4722 12029	Time 0.04 0.16 0.08 25.68 20.78 40.73	Comm States 161 2609 986 1951443 581749 549120	Time 0.04 0.13 0.04 7.52 2.25 2.1
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4	31 67 35 84 84 84 65	Even States 161 7132 12029 1933	Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13	NewEv States 161 2765 986 597	Time 0.04 0.14 0.04 31.76 14.17 29.46 0.11	States 161 30054 320169 597	Time 0.04 0.29 1.25 34.19 60.31 60.34 0.11	Transi States 161 30731 320169 597	Time 0.04 0.3 1.25 11.25 20 36.01 0.11	States 363 4722 12029 33136	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34	Comn States 161 2609 986 1951443 581749 549120 485	$\begin{array}{c} \text{non} \\ \hline \text{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4	31 67 35 84 84 84 65 80	Even States 161 7132 12029 1933 24	nts <u>Time</u> 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07	NewEv States 161 2765 986 597 24	ents <u>Time</u> 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07	Stat States 161 30054 320169	Time 0.04 0.29 1.25 34.19 60.31 60.34 0.11 0.1	Transi States 161 30731 320169 597 31	$\begin{array}{c} \hline \text{Time} \\ \hline 0.04 \\ 0.3 \\ 1.25 \\ 11.25 \\ 20 \\ 36.01 \\ 0.11 \\ 0.09 \end{array}$	States 363 4722 12029 33136	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09	Comm States 161 2609 986 1951443 581749 549120	non Time 0.04 0.13 0.04 7.52 2.25 2.1 0.09 0.07
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host	31 67 35 84 84 84 65 80 28	Even States 161 7132 12029 1933 24 19	nts <u>Time</u> 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05	NewEv States 161 2765 986 597 24 19	ents <u>Time</u> 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05	States 161 30054 320169 597 54 49	Time 0.04 0.29 1.25 34.19 60.31 60.34 0.11 0.1 0.08	Transi States 161 30731 320169 597 31 19	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.05	States 363 4722 12029 33136 48 43	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07	Comn States 161 2609 986 1951443 581749 549120 485 24 19	Time 0.04 0.13 0.04 7.52 2.25 2.1 0.09 0.07 0.05
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocl tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave	31 67 35 84 84 84 65 80 28 14	Even States 161 7132 12029 1933 24 19 5	Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05 0.03	NewEv States 161 2765 986 597 24 19 5	ents <u>Time</u> 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03	States 161 30054 320169 597 54 49 5	Time 0.04 0.29 1.25 34.19 60.31 60.34 0.11 0.1 0.08 0.03	Transi States 161 30731 320169 597 31 19 12	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.05           0.03	States 363 4722 12029 33136 48 43	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03	Comn States 161 2609 986 1951443 581749 549120 485 24 19 5	non           Time           0.04           0.13           0.04           7.52           2.25           2.1           0.09           0.07           0.05           0.02
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5	31 67 35 84 84 65 80 28 14 88	Even States 161 7132 12029 1933 24 19	Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05 0.03 0.1	NewEv States 161 2765 986 597 24 19	ents <u>Time</u> 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08	States 161 30054 320169 597 54 49	Time 0.04 0.29 1.25 34.19 60.31 60.34 0.11 0.1 0.08	Transi States 161 30731 320169 597 31 19 12 31	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.05           0.03           0.1	States         363           4722         12029           33136         48           43         5           48         43	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03 0.11	Comn States 161 2609 986 1951443 581749 549120 485 24 19	Time           0.04           0.13           0.04           7.52           2.25           2.1           0.09           0.07           0.05           0.02           0.09
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocl tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave	31 67 35 84 84 84 65 80 28 14	Ever States 161 7132 12029 1933 24 19 5 31 19	Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05 0.03 0.1 0.06	NewEv States 161 2765 986 597 24 19 5 24 19	ents <u>Time</u> 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08 0.06	States 161 30054 320169 597 54 49 5 54	Time           0.04           0.29           1.25           34.19           60.31           60.34           0.11           0.08           0.03           0.13           0.1	Transi States 161 30731 320169 597 31 19 12 31 19	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.05           0.03           0.1           0.00	States         363           4722         12029           33136         48           43         5           48         43	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03 0.11 0.09	Comn States 161 2609 986 1951443 581749 549120 485 24 19 5 24	$\begin{array}{c} \hline \text{Inon} \\ \hline \hline \text{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \end{array}$
Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host profisafe_i6	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94$	Ever States 161 7132 12029 1933 24 193 5 31 19 31	Time           0.04           0.24           0.08           15.77           20.02           22.94           0.13           0.07           0.05           0.03           0.1           0.06           0.11	NewEv States 161 2765 986 597 24 19 5 24 19 5 24 19 24	ents <u>Time</u> 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08 0.06 0.1	States 161 30054 320169 597 54 49 55 54 49 54	Time           0.04           0.29           1.25           34.19           60.31           60.34           0.11           0.08           0.03           0.13           0.14	Transi States 161 30731 320169 597 31 19 12 31 19 31	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.05           0.03           0.11           0.09           0.05           0.03           0.11	States         363           34722         12029           33136         48           43         5           48         43           43         48           43         48	$\begin{array}{c} \hline {\rm Time} \\ 0.04 \\ 0.16 \\ 0.08 \\ 25.68 \\ 20.78 \\ 40.73 \\ 0.34 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.09 \\ 0.12 \end{array}$	Comn States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 5 24 19 24	$\begin{array}{c} \hline \mathbf{non} \\ \hline \mathbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_host profisafe_i5_profisafe_i5_host profisafe_i6_profisafe_i6_host	31 67 35 84 84 65 80 28 14 88 28	Ever States 161 7132 12029 1933 24 19 5 31 19	Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05 0.03 0.1 0.06	NewEv States 161 2765 986 597 24 19 5 24 19	ents Time 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08 0.06	States 161 30054 320169 597 54 49 55 54 49	Time           0.04           0.29           1.25           34.19           60.31           60.34           0.11           0.08           0.03           0.13           0.1	Transi States 161 30731 320169 597 31 19 12 31 19 31 19	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.05           0.03           0.11           0.09           0.05           0.03           0.11	States         363           3722         12029           33136         48           43         5           48         43           43         48           43         48	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03 0.11 0.09	Comn States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 5 24 19 9 24	$\begin{array}{c} \hline \text{Inon} \\ \hline \hline \text{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_bost profisafe_i5_host profisafe_i6_profisafe_i6_host profisafe_i6_host	$\begin{array}{c} 31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \end{array}$	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 29	Time 0.04 0.24 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05 0.03 0.11 0.06 0.11 0.07 0.07	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 24 19 83	ents Time 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08 0.06 0.1 0.07 0.08	States 161 30054 320169 597 54 49 5 54 49 54 49 54 49 54 49 54 49 54 49 54 54 54 54 54 54 54 54 54 54	Time 0.04 0.29 1.25 34.19 60.31 60.34 0.11 0.14 0.08 0.03 0.13 0.13 0.14 0.14 0.09	Transi States 161 30731 320169 597 31 19 12 31 19 31 19 31 19 47	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.03           0.1           0.06           0.11           0.06           0.11	States         363           3722         12029           33136         48           43         5           48         43           43         252	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03 0.11 0.09 0.12 0.1 0.13	Comn States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 24 19 24 19 31	$\begin{array}{c} \text{non} \\ \hline \textbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.07 \\ 0.07 \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	$\begin{array}{c} 31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 84 \end{array}$	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 29 22	Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.03 0.03 0.11 0.06 0.11 0.07 0.07	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 24 19 83 83	ents Time 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08 0.06 0.1 0.07 0.08 0.09	States 161 30054 320169 597 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 54 54 54 54 54 54 54 54 54	Time           0.04           0.29           1.25           34.19           60.31           60.34           0.11           0.18           0.03           0.13           0.14           0.19           0.09	Transi States 161 30731 320169 597 31 19 12 31 19 31 19 47	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.03           0.11           0.06           0.11           0.09           0.011           0.06           0.11           0.06           0.11           0.07	States         363           363         4722           12029         33136           48         43           45         48           43         5           48         43           252         252	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03 0.11 0.09 0.12 0.1 0.13 0.13	Comm States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 24 19 31 31	$\begin{array}{c} \text{non} \\ \hline \textbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.08 \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_profisafe_i5_profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host	$\begin{array}{c} 31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 84 \end{array}$	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 31 19 29	Time           0.04           0.24           0.08           15.77           20.02           22.94           0.13           0.07           0.03           0.11           0.07           0.07           0.07           0.07	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 24 19 83	ents Time 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08 0.06 0.1 0.07 0.08	States           161           30054           320169           597           54           49           54           49           54           49           49           309           49           50           410           50           410           50           50           50           51           52           54           55           56           57           58           59           50           50	Time 0.04 0.29 1.25 34.19 60.31 60.34 0.11 0.14 0.08 0.03 0.13 0.13 0.14 0.14 0.09	Transi States 161 30731 320169 597 31 19 12 31 19 31 19 31 19 47 47 47	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.03           0.1           0.06           0.11           0.09           0.09           0.09           0.09	States         363           363         4722           12029         33136           48         43           5         48           43         48           43         252           252         252	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03 0.11 0.09 0.12 0.1 0.13	Comn States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 24 19 24 19 31	$\begin{array}{c} \text{non} \\ \hline \textbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.07 \\ 0.07 \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84 90	Ever States 161 7132 12029 1933 24 193 5 31 19 31 19 31 19 22 22 29	nts Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05 0.03 0.11 0.06 0.11 0.07 0.07 0.07 0.08 0.08	NewEv States 161 2765 986 597 24 19 5 5 24 19 24 19 24 19 83 83 83 83 24	ents Time 0.04 0.14 0.04 31.76 14.17 29.46 0.11 0.07 0.05 0.03 0.08 0.06 0.1 0.07 0.08 0.09 0.09 0.09 0.08	States           161           30054           320169           597           54           49           54           49           54           49           54           309           54           54           54           49           54           55           54           55           55           56           57           58           54	Time           0.04           0.29           1.25           34.19           60.31           60.34           0.11           0.03           0.13           0.14           0.19           0.09           0.11           0.09           0.12	Transi States 161 30731 320169 597 31 19 12 31 19 31 19 31 19 47 47 47	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.03           0.11           0.06           0.11           0.06           0.11           0.06           0.11           0.07           0.09           0.09           0.09           0.09	States         363           34722         12029           33136         48           43         5           5         48           43         252           2522         2522           48         48	Time 0.04 0.16 0.08 25.68 20.78 40.73 0.34 0.09 0.07 0.03 0.11 0.09 0.12 0.12 0.13 0.13 0.14 0.1	Comm States 161 2609 986 1951443 581749 549120 485 24 19 5 5 24 19 24 19 24 19 31 31 31 24	$\begin{array}{c} \text{10n} \\ \hline \text{Time} \\ \hline 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \end{array}$
Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6_ profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_ profisafe_o4_host	31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84 90 30	Ever States 161 7132 12029 1933 24 19 31 19 31 19 31 19 22 29 22 9 24	nts Time 0.04 0.24 0.08 15.77 20.02 22.94 0.13 0.07 0.05 0.03 0.11 0.06 0.11 0.07 0.07 0.07 0.08 0.08 0.08 0.04 0.08 0.09 0.02 0.02 0.02 0.02 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.06 0.07 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.03 0.07 0.05 0.07 0.05 0.03 0.07 0.07 0.07 0.07 0.07 0.08 0.07 0.07 0.08 0.07 0.07 0.08 0.08 0.07 0.07 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.05 0.08 0.05 0.08 0.05 0.08 0.05 0.08 0.05 0.08 0.05 0.08 0.05 0.08 0.05 0.08 0.05 0.05 0.08 0.05	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 24 19 83 83 83 83 83 83	$\begin{array}{c} \text{ents} \\ \hline \textbf{Time} \\ 0.04 \\ 0.14 \\ 0.04 \\ 31.76 \\ 0.11 \\ 0.07 \\ 0.05 \\ 0.03 \\ 0.08 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ \end{array}$	States           161           30054           320169           597           54           49           5           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           49           49           54           49           54           49           54           54	$\begin{array}{c} \overline{\text{Time}} \\ \hline \hline \hline 0.04 \\ 0.29 \\ 1.25 \\ 34.19 \\ 60.31 \\ 60.34 \\ 0.11 \\ 0.11 \\ 0.08 \\ 0.03 \\ 0.13 \\ 0.14 \\ 0.11 \\ 0.09 \\ 0.09 \\ 0.12 \\ 0.09 \\ 0.12 \\ 0.09 \end{array}$	Transi States 161 30731 320169 597 31 19 12 31 19 31 19 47 47 47 31 19	Time           0.04           0.3           1.25           11.25           20           36.01           0.11           0.09           0.05           0.03           0.11           0.09           0.01           0.07           0.09           0.09           0.09           0.09           0.09           0.09           0.09           0.09	States         363           34722         12029           33136         48           43         5           48         43           42         252           252         252           252         48           43	$\begin{array}{c} \hline {\rm Time} \\ 0.04 \\ 0.16 \\ 0.08 \\ 25.68 \\ 20.78 \\ 40.73 \\ 0.34 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.09 \\ 0.12 \\ 0.1 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.1 \\ 0.07 \end{array}$	Comm States 161 2609 986 1951443 581749 549120 485 244 19 5 244 19 24 19 24 19 24 19 24 19 24	$\begin{array}{c} \text{non} \\ \hline \textbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.05 \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_o4_host profisafe_o4_slave	31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84 90 30 16	Ever States 161 7132 12029 1933 24 19 3 11 19 31 19 29 24 29 24 19 31 19 31 19 31 19 35 31 19 31 19 35 35 31 19 35 35 35 19 35 35 35 35 35 35 35 35 35 35	nts <u>Time</u> 0.04 0.24 0.08 15.77 22.94 0.13 0.07 0.05 0.03 0.11 0.06 0.11 0.07 0.07 0.07 0.08 0.08 0.08 0.08 0.08 0.08 0.08	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 24 19 83 83 83 24 19 5 5 24	$\begin{array}{c} \text{ents} \\ \hline \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \\ \\ \\ \hline \\$	States           161           30054           320169           597           54           49           54           49           54           49           54           3054           30054           597           54           49           54           49           54           49           54           49           54           55           54           55           54           55           54           55           54 <td><math display="block">\begin{array}{c} \hline {\rm Time} \\ \hline {\rm Time} \\ 0.04 \\ 0.29 \\ 1.25 \\ 34.19 \\ 0.34.19 \\ 0.03 \\ 0.11 \\ 0.14 \\ 0.00 \\ 0.03 \\ 0.11 \\ 0.14 \\ 0.01 \\ 0.09 \\ 0.09 \\ 0.01 \\ 0.09 \\ 0.03 \\ 0.09 \\ 0.03 \\ \end{array}</math></td> <td>Transi States 161 30731 320169 597 31 19 12 31 19 31 19 47 47 47 31 19 12</td> <td><math display="block">\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline 0.04 \\ 0.3 \\ 1.25 \\ 11.25 \\ 20 \\ 36.01 \\ 0.11 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.05 \\ 0.04 \end{array}</math></td> <td>States         363           3722         12029           33136         48           43         5           48         43           425         252           252         252           48         43           5         5</td> <td><math display="block">\begin{array}{c} \hline {\rm Time} \\ \hline 0.04 \\ 0.16 \\ 0.08 \\ 25.68 \\ 20.78 \\ 40.73 \\ 0.34 \\ 40.73 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.09 \\ 0.12 \\ 0.11 \\ 0.13 \\ 0.14 \\ 0.11 \\ 0.07 \\ 0.03 \\ \end{array}</math></td> <td>Comn States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 24 19 24 19 31 31 31 24 5 5 5 5 5 5 5 5 7 4 9 5 5 5 7 4 9 5 5 7 5 8 7 5 8 7 5 8 7 5 8 7 8 7 9 8 6 7 9 8 6 7 8 7 8 7 9 8 7 8 7 9 8 7 9 8 7 8 7 9 8 7 9 8 7 9 7 9</td> <td><math display="block">\begin{array}{c} \text{non} \\ \hline \textbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.05 \\ 0.03 \\ \end{array}</math></td>	$\begin{array}{c} \hline {\rm Time} \\ \hline {\rm Time} \\ 0.04 \\ 0.29 \\ 1.25 \\ 34.19 \\ 0.34.19 \\ 0.03 \\ 0.11 \\ 0.14 \\ 0.00 \\ 0.03 \\ 0.11 \\ 0.14 \\ 0.01 \\ 0.09 \\ 0.09 \\ 0.01 \\ 0.09 \\ 0.03 \\ 0.09 \\ 0.03 \\ \end{array}$	Transi States 161 30731 320169 597 31 19 12 31 19 31 19 47 47 47 31 19 12	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline 0.04 \\ 0.3 \\ 1.25 \\ 11.25 \\ 20 \\ 36.01 \\ 0.11 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.05 \\ 0.04 \end{array}$	States         363           3722         12029           33136         48           43         5           48         43           425         252           252         252           48         43           5         5	$\begin{array}{c} \hline {\rm Time} \\ \hline 0.04 \\ 0.16 \\ 0.08 \\ 25.68 \\ 20.78 \\ 40.73 \\ 0.34 \\ 40.73 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.09 \\ 0.12 \\ 0.11 \\ 0.13 \\ 0.14 \\ 0.11 \\ 0.07 \\ 0.03 \\ \end{array}$	Comn States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 24 19 24 19 31 31 31 24 5 5 5 5 5 5 5 5 7 4 9 5 5 5 7 4 9 5 5 7 5 8 7 5 8 7 5 8 7 5 8 7 8 7 9 8 6 7 9 8 6 7 8 7 8 7 9 8 7 8 7 9 8 7 9 8 7 8 7 9 8 7 9 8 7 9 7 9	$\begin{array}{c} \text{non} \\ \hline \textbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.05 \\ 0.03 \\ \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_ profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4 profisafe_o4_host profisafe_o5	31 67 35 84 84 84 65 80 28 14 88 94 28 84 84 90 30 16 99	Ever States 161 7132 12029 1933 24 19 31 19 31 19 29 22 29 24 19	$\begin{array}{c} \text{nts} \\ \hline \hline \hline \hline \hline \\ \hline \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline $	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 24 19 83 83 83 83 24 19 5 5 24	$\begin{array}{c} {\rm ents} \\ \hline {\rm Time} \\ 0.04 \\ 0.14 \\ 0.04 \\ 31.76 \\ 0.11 \\ 0.07 \\ 0.05 \\ 0.03 \\ 0.08 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.03 \\ 0.09 \\ 0.03 \\ 0.03 \\ 0.09 \end{array}$	States           161           30054           320169           597           54           49           54           49           54           49           54           300           54           55           54           49           55           54           55           54           55           54           49           55           54           55           54           55           54           55           54	$\begin{array}{c} {\rm Time} \\ \hline {\rm Time} \\ 0.04 \\ 0.29 \\ 1.25 \\ 34.19 \\ 60.31 \\ 60.34 \\ 0.11 \\ 0.18 \\ 0.03 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.12 \\ 0.09 \\ 0.03 \\ 0.14 \end{array}$	Transi States 161 30731 320169 597 31 199 12 31 19 47 47 47 47 31 19 12 31 19 31 19 31 321 31 321 31 321 32 31 321 32	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline 0.04 \\ 0.3 \\ 1.25 \\ 11.25 \\ 20 \\ 36.01 \\ 0.11 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.04 \\ 0.11 \end{array}$	States           363           4722           12029           33136           48           43           5           48           43           252           252           252           252           252           48           43           48           43           48           43           5           48           43	Time           0.04           0.16           0.08           20.78           40.73           0.34           0.09           0.07           0.03           0.11           0.09           0.12	Comm States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 24 19 31 31 31 31 24 19 5 24	$\begin{array}{c} \hline 100 \\ \hline \mathbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.03 \\ 0.03 \\ 0.09 \end{array}$
Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_ profisafe_i5_ profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5_ profisafe_o5_host	31 67 35 84 84 84 65 80 28 14 88 94 28 78 84 84 84 90 30 16 99 30	Ever States 161 7132 12029 1933 24 19 5 31 19 31 19 29 22 29 24 19 5 24 19 5 31 19 32 29 29 24 29 29 20 29 24 29 29 20 20 20 20 20 20 20 20 20 20	$\begin{array}{c} \text{nts} \\ \hline \hline \hline \hline \\ \hline \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ $	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 24 19 24 19 5 24 19 5 24 19 5 24 19 5 24 19 5 5 24 19 9 83	$\begin{array}{c} {\rm ents} \\ \hline {\rm Time} \\ 0.04 \\ 0.14 \\ 0.04 \\ 0.04 \\ 31.76 \\ 0.04 \\ 14.17 \\ 29.46 \\ 0.11 \\ 0.07 \\ 0.05 \\ 0.03 \\ 0.08 \\ 0.06 \\ 0.01 \\ 0.09 \\ 0.08 \\ 0.09 \\ 0.08 \\ 0.09 \\ 0.008 \\ 0.009 \\ 0.008 \\ 0.009 \\ 0.008 \\ 0.009 \\ 0.008 \\ 0.009 \\ 0.008 \\ 0.000 \\ $	States           161           30054           320169           597           54           49           54           49           54           49           54           300           54           55           54           49           55           54           55           54           55           54           49           55           54           55           54           55           54           55           54	$\begin{array}{c} {\rm Time} \\ \hline {\rm Time} \\ 0.04 \\ 0.29 \\ 1.25 \\ 34.19 \\ 60.31 \\ 60.34 \\ 0.11 \\ 0.11 \\ 0.08 \\ 0.03 \\ 0.13 \\ 0.14 \\ 0.11 \\ 0.09 \\ 0.12 \\ 0.09 \\ 0.12 \\ 0.09 \\ 0.03 \\ 0.14 \\ 0.11 \end{array}$	Transi States 161 30731 320169 597 31 19 12 31 19 47 47 47 47 47 31 19 12 31 19	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline 0.04 \\ 0.3 \\ 1.25 \\ 11.25 \\ 20 \\ 36.01 \\ 0.11 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.004 \\ 0.11 \\ 0.06 \end{array}$	States           363           4722           12029           33136           48           43           5           252           252           252           252           48           43           5           48           43           45           48           43           5           48           43           5           48           43	Time           0.04           0.16           0.08           20.78           40.73           0.34           0.09           0.07           0.03           0.11           0.09           0.12           0.13           0.13           0.14           0.17           0.03           0.12           0.03           0.12           0.03           0.12	$\begin{array}{c} \text{Comm} \\ \hline \text{States} \\ 161 \\ 2609 \\ 986 \\ 1951443 \\ 581749 \\ 549120 \\ 485 \\ 24 \\ 199 \\ 5 \\ 24 \\ 199 \\ 24 \\ 199 \\ 311 \\ 311 \\ 311 \\ 311 \\ 24 \\ 199 \\ 5 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \end{array}$	$\begin{array}{c} \hline 100 \\ \hline \mathbf{Time} \\ 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.1 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.08 \\ 0.03 \\ 0.03 \\ 0.09 \end{array}$
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Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i5_ profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_slave profisafe_o5_host profisafe_o6_host	$\begin{array}{c} 31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 84 \\ 84 \\ 84 \\ 90 \\ 30 \\ 116 \\ 99 \\ 30 \\ 106 \\ 30 \end{array}$	Ever States 161 7132 12029 1933 24 199 5 311 19 31 199 22 29 24 19 5 5 24 19 5 5 24 199 22 29 24 24	$\begin{array}{c} {\rm mts} \\ \hline {\rm Time} \\ 0.04 \\ 0.02 \\ 0.03 \\ 0.04 \\ 0.03 \\ 0.07 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.011 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.011 \\ 0.06 \\ 0.11 \\ 0.07 \end{array}$	NewEv States 161 2765 986 597 24 19 5 24 19 24 19 83 83 83 24 19 5 24 19 9 5 24 19 9 24	$\begin{array}{c} \text{ents} \\ \hline \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \\ \hline \\ \\ \\ \hline \\$	$\begin{array}{r} {\rm Stat} \\ \hline {\rm States} \\ 161 \\ 30054 \\ 320169 \\ \hline \\ 597 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 49 \\ 54 \\ 54$	$\begin{array}{c} \hline {\rm Time} \\ \hline {\rm Time} \\ 0.04 \\ 0.29 \\ 1.25 \\ 34.19 \\ 60.31 \\ 60.34 \\ 0.11 \\ 0.14 \\ 0.03 \\ 0.03 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.09 \\ 0.00 \\ 0.11 \\ 0.12 \\ 0.09 \\ 0.01 \\ 0.12 \\ 0.09 \\ 0.11 \\ 0.16 \\ 0.11 \end{array}$	Transi States 161 30731 320169 597 31 19 12 31 19 47 47 47 47 47 31 19 12 31 19 12 31 19 12 31 19 12 31 19 12 31 19 12 31 19 12 31 31 19 12 31 31 19 31 32 16 31 32 16 31 32 16 31 32 16 31 32 31 31 32 31 32 31 31 31 32 31 31 31 32 31 31 31 31 31 31 31 31 31 31 31 31 31	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline 0.04 \\ 0.3 \\ 1.25 \\ 11.25 \\ 20 \\ 36.01 \\ 0.11 \\ 0.09 \\ 0.09 \\ 0.03 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.001 \\ 0.012 \\ 0.012 \\ 0.07 \end{array}$	States         363           363         4722           12029         33136           48         43           5         48           43         252           252         252           252         252           48         43           43         43           43         48           43         43           5         48           43         5           48         43           48         43           48         43	Time           0.04           0.16           0.08           225.68           20.78           40.73           0.34           0.09           0.07           0.03           0.11           0.09           0.12           0.13           0.14           0.17           0.03           0.14           0.13           0.14           0.13           0.12           0.03           0.12           0.03           0.13           0.13	Comm States 161 2609 986 1951443 581749 549120 485 24 19 5 24 19 31 31 31 31 31 31 24 19 5 24 19 24 19 24 19 5 24 19 31 31 31 31 24 19 5 24 19 24 24 19 24 24 19 24 24 24 19 24 24 24 24 24 24 24 24 24 24 24 24 24	$\begin{array}{c} \text{10n} \\ \hline \text{Time} \\ \hline 0.04 \\ 0.13 \\ 0.04 \\ 7.52 \\ 2.25 \\ 2.1 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.02 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \end{array}$

Table 3.8 MODULAR CONTROLLABILITY CHECK NOT PREFERRING PLANTS, SMALLEST CONTROLLER FIRST

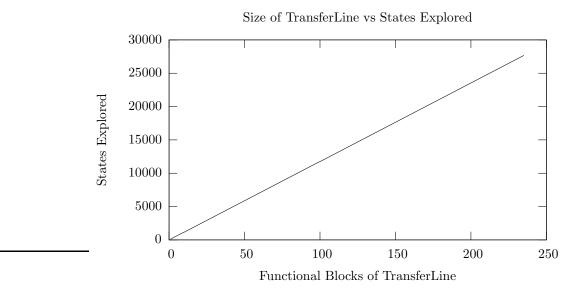


Figure 3.3

# Chapter 4 Parallel Checker

The parallel checker instead of trying to prove that each controller is controllable one after the other instead tries interleave the process of proving each controller with proving every other controller. This is for two basic reasons. Firstly, because if there is one specification in the model for which it is easy to prove that it is not controllable, the parallel checker should be capable of discovering this relatively quickly, whereas the standard approach may have to waist time proving other specifications first. Secondly, if the system as a whole is controllable, it may be useful to use solve those specifications which, can be proved quickly, early on, so as to aid in proving the harder specifications.

### 4.1 Algorithm

The algorithm is detailed in Figure 4.1. This algorithm behaves like the standard modular algorithm detailed in Figure 3.1. The main difference is that, instead of just picking a controller to prove and then sticking with it, we instead for each controller do one iteration to attempt to prove it, and then proceed to do an iteration for the next controller down the line. In addition, if we manage to prove a controller controllable, we proceed to look through all the other compositions and remove from them any automata which were added after the proven automata. This is because now that the controller can be considered as a plant, it is quite likely that many counterexamples disappear and thus some of the plants added afterwards could very well be completely unnecessary.

### 4.2 Results

Most of what was stated in the results section for the modular controllability checker is also true here. The only thing of any particular significance is how efficient the parallel checker seems to be at solving the ftechnik example especially considering how much trouble the standard modular checker has trying to solve it. The reason for this is that ftechnik has a counterexample which C equals the set of Controller automata in the model and P the set of Plant automata, and S is the queue of sets of composed automata.

- 1. Set the queue S as being empty.
- 2. For every controller  $C_i$  create the list  $S_i$ . Add  $C_i$  to the front of it and add it to S
- 3. If S is empty the model has been proven controllable. Otherwise, remove  $S_i$  from the front of S.
- 4. Check controllability of  $S_I$  using the monolithic method. Consider all automata which are elements of C as controllers and all automata which are elements of P as plants.
- 5. If no counterexample for S was found go to 9. Otherwise set t to be the counterexample found by the controllability check.
- 6. Set the set N to contain all automata in P and C which would not accept the counterexample t. Take into consideration for all automata in C that specifications in addition to not accepting t must also not consider t as being a counterexample to their controller.
- 7. If N is empty then the model has been proven uncontrollable and t represents a counterexample in the system. Otherwise pick a subset of N to add to the end of  $S_i$ .
- 8. Add  $S_i$  on to the end of S then go to 3.
- 9. For all elements  $C_j$  of  $S_i$  if they are also an element of C, remove them from C and add them to P, also for all lists in S remove all automata added after  $C_i$  if it is present. Then go to 3.

Figure 4.1: Modular Controllability checking algorithm

is only one event long, and thus can be found very quickly. Thus the parallel checker has an extreme advantage here in that it can start looking at the controller which speaks of this counterexample right of the bat without going to much effort trying to prove the other controllers. This however represents an extreme case which is not indicative of most models. Thus it would have been good if we had more uncontrollable models which were harder but not as hard as tbed\_uncont or rhone\_tough to test to see if this same effect can come in handy on less extreme cases as well.

It should be noted that language inclusion is not looked at here as for most language inclusion problems we only consider one property at a time. Thus, the parallel checker is unlikely to give interesting results.

Model					Paralle	el controllability, preferring plants Late MaxCommon MaxCommon M							
		A	11	Ear	ly	La	ite	MaxCo	ommon	MaxCo	ommon	Ma	х
				NotAc	*		ccept		ents		ontr	Stat	
Name	Aut	States	Time	States	Time	States		States	Time	States	Time	States	Time
big_bmw	31	1065	0.07	207	0.06	350	0.05	442	0.06		0.05	5479	0.11
fzelle	67	7885	0.19	9670	0.31	2240	0.18	2405	0.19		0.19	2122	0.16
rhone_alps		225113		1040434	4.92	1720	0.06	1544	0.06		0.07	1926	0.07
tbed_ctct	84	119806	0.43	18391	0.14		27.16	18391	0.14	22298	0.15		52.13
tbed_nocoll	84		24.14		267.03		41.64		52.25		65.13		107.54
tbed_noderail	84		24.39		267.11		233.02		50.75		75.25		78.47
verriegel4	65	3511	0.17	25888	0.34	597	0.14	6335	0.22		0.24	33713	0.43
profisafe_i4	80	51	0.11	61	0.12	38	0.1	48	0.11	48	0.1	48	0.11
profisafe_i4_host	28	43	0.08	49	0.1	33	0.07	43	0.08	43	0.08	43	0.08
profisafe_i4_slave	14	8	0.03		0.04	5	0.03	5	0.02	5		5	0.03
profisafe_i5	88	51	0.13	61	0.14	38	0.11	48	0.13		0.14	48	0.12
profisafe_i5_host	28	43	0.1	49	0.11	33	0.08	43	0.1	43	0.09	43	0.09
profisafe_i6	94	51	0.14	61	0.17	38	0.13	48	0.15	48	0.15	48	0.14
profisafe_i6_host	28	43	0.11	49	0.13	33	0.09	43	0.11	43	0.11	43	0.11
profisafe_inclusion_i4host	78	184	0.09	177	0.1	59	0.09	88	0.1	195	0.13	137	0.11
profisafe_inclusion_o4host	84	184	0.1	177	0.12	59	0.1	88	0.11	195	0.14	137	0.11
profisafe_inclusion_o4slave	84	184	0.1	177	0.12	59	0.1	88	0.12	195	0.14	137	0.11
profisafe_04	90	51	0.12	61	0.14	38	0.12	48	0.12	48	0.12	48	0.12
profisafe_o4_host	30	43	0.08	49	0.09	33	0.07	43	0.08	43	0.09	43	0.09
profisafe_o4_slave	16	8	0.04	12	0.04	5	0.04	5	0.04	5	0.04	5	0.04
profisafe_05	99	51	0.14	61	0.16	38	0.13	48	0.14	48	0.14	48	0.13
profisafe_o5_host	30	43	0.1	49	0.11	33	0.09	43	0.1	43	0.1	43	0.09
profisafe_06	106		0.17	61	0.18	38	0.14	48	0.16		0.16	48	0.16
profisafe_o6_host	- 30	43	0.11	49	0.13	33	0.09	43	0.11	43	0.11	43	0.11
ftechnik	36	113	0.05	113	0.05	113	0.04	113	0.05	113	0.04	113	0.05
rhone_tough	61		13.54		28.74		32.97		23.09		9.1		28.24
tbed_uncont	84		24.03		267		41.48		205.83		170.16	<b>D</b> 11	188.66
Model		M Eve		Mi NewE		M Sta	in	M Trans	in	0	ne	RelN Comr	
Name	Aut		Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw		174	0.05	174	0.05	174	0.05	174	0.04	381	0.05	174	0.05
	31					111	0.00	114		001	0.00	111	
8	31 67				0.18	7266	0.3	10792	0.31	1464	0.22	2670	
fzelle	67	5681	0.26	2574	0.18	7266 17100	$0.3 \\ 0.12$		0.31	4464 1720	0.22	$2670 \\ 1720$	0.18
fzelle rhone_alps			$0.26 \\ 0.07$		0.06	7266 17100	0.12	10792 17077	0.12	4464 1720	0.05	1720	$\begin{array}{c} 0.18 \\ 0.06 \end{array}$
fzelle rhone_alps tbed_ctct	67 35 84	5681	$0.26 \\ 0.07 \\ 45.84$	2574	$0.06 \\ 41.28$		$\begin{array}{c} 0.12\\ 40.88 \end{array}$		$0.12 \\ 16.34$		$0.05 \\ 12.45$		$\begin{array}{c} 0.18 \\ 0.06 \\ 7.69 \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll	67 35 84 84	5681	0.26 0.07 45.84 62.23	2574 1720	$0.06 \\ 41.28 \\ 64.08$		$0.12 \\ 40.88 \\ 158.22$		$0.12 \\ 16.34 \\ 67.25$		$0.05 \\ 12.45 \\ 155.68$	1720	$\begin{array}{c} 0.18 \\ 0.06 \\ 7.69 \\ 55.7 \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail	67 35 84 84 84	5681 1697	$0.26 \\ 0.07 \\ 45.84 \\ 62.23 \\ 170.83$	2574 1720	$0.06 \\ 41.28 \\ 64.08 \\ 202.59$	17100	$0.12 \\ 40.88 \\ 158.22 \\ 157.93$	17077	$0.12 \\ 16.34 \\ 67.25 \\ 177.41$	1720	$0.05 \\ 12.45 \\ 155.68 \\ 160.45$	1720 1951443	$\begin{array}{c} 0.18 \\ 0.06 \\ 7.69 \\ 55.7 \\ 56.03 \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4	67 35 84 84 84 65	5681 1697 2011	$0.26 \\ 0.07 \\ 45.84 \\ 62.23 \\ 170.83 \\ 0.17$	2574 1720 675	$0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15$	17100 675	$0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15$	17077 675	0.12 16.34 67.25 177.41 0.14	1720 33214	$\begin{array}{c} 0.05 \\ 12.45 \\ 155.68 \\ 160.45 \\ 0.39 \end{array}$	1720 1951443 563	$\begin{array}{c} 0.18 \\ 0.06 \\ 7.69 \\ 55.7 \\ 56.03 \\ 0.13 \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4	67 35 84 84 84 65 80	5681 1697 2011 38	$0.26 \\ 0.07 \\ 45.84 \\ 62.23 \\ 170.83 \\ 0.17 \\ 0.09$	2574 1720 675 38	$0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09$	17100 675 54	$0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15 \\ 0.12$	17077 675 45	$0.12 \\ 16.34 \\ 67.25 \\ 177.41 \\ 0.14 \\ 0.11$	1720 33214 48	0.05 12.45 155.68 160.45 0.39 0.1	1720 1951443 563 38	$\begin{array}{c} 0.18 \\ 0.06 \\ 7.69 \\ 55.7 \\ 56.03 \\ 0.13 \\ 0.09 \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocell tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host	67 35 84 84 84 65	5681 1697 2011 38 33	$0.26 \\ 0.07 \\ 45.84 \\ 62.23 \\ 170.83 \\ 0.17 \\ 0.09 \\ 0.08$	2574 1720 675 38 33	0.06 41.28 64.08 202.59 0.15 0.09 0.07	17100 675 54 49	$\begin{array}{c} 0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15 \\ 0.12 \\ 0.09 \end{array}$	17077 675 45 33	$\begin{array}{c} 0.12 \\ 16.34 \\ 67.25 \\ 177.41 \\ 0.14 \\ 0.07 \end{array}$	1720 33214 48 43	0.05 12.45 155.68 160.45 0.39 0.1 0.08	1720 1951443 563 38 33	$\begin{array}{c} 0.18 \\ 0.06 \\ 7.69 \\ 55.7 \\ 56.03 \\ 0.13 \\ 0.09 \\ 0.07 \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4	67 35 84 84 65 80 28	5681 1697 2011 38	$0.26 \\ 0.07 \\ 45.84 \\ 62.23 \\ 170.83 \\ 0.17 \\ 0.09$	2574 1720 675 38	$0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09$	17100 675 54	$0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15 \\ 0.12$	17077 675 45	$0.12 \\ 16.34 \\ 67.25 \\ 177.41 \\ 0.14 \\ 0.11$	1720 33214 48	0.05 12.45 155.68 160.45 0.39 0.1	1720 1951443 563 38	$\begin{array}{c} 0.18 \\ 0.06 \\ 7.69 \\ 55.7 \\ 56.03 \\ 0.13 \\ 0.09 \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave	67 35 84 84 65 80 28 14	5681 1697 2011 38 33 5	0.26 0.07 45.84 62.23 170.83 0.17 0.09 0.08 0.03	2574 1720 675 38 33 5	0.06 41.28 64.08 202.59 0.15 0.09 0.07 0.03	$   \begin{array}{r}     17100 \\     675 \\     54 \\     49 \\     5   \end{array} $	$\begin{array}{c} 0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15 \\ 0.12 \\ 0.09 \\ 0.03 \end{array}$	$     \begin{array}{r}       17077 \\       675 \\       45 \\       33 \\       12     \end{array} $	$\begin{array}{c} 0.12 \\ 16.34 \\ 67.25 \\ 177.41 \\ 0.14 \\ 0.11 \\ 0.07 \\ 0.03 \end{array}$	1720 33214 48 43 5	0.05 12.45 155.68 160.45 0.39 0.1 0.08 0.03	1720 1951443 563 38 33 5	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave profisafe_i5	67 35 84 84 65 80 28 14 88	5681 1697 2011 38 33 5 45	$\begin{array}{c} 0.26 \\ 0.07 \\ 45.84 \\ 62.23 \\ 170.83 \\ 0.17 \\ 0.09 \\ 0.08 \\ 0.03 \\ 0.12 \end{array}$	2574 1720 675 38 33 5 38	$\begin{array}{c} 0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \end{array}$	$     \begin{array}{r}       17100 \\       675 \\       54 \\       49 \\       5 \\       54 \\       54     \end{array} $	$\begin{array}{c} 0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15 \\ 0.12 \\ 0.09 \\ 0.03 \\ 0.14 \end{array}$	$     \begin{array}{r}       17077 \\       675 \\       45 \\       33 \\       12 \\       45     \end{array} $	$\begin{array}{c} 0.12 \\ 16.34 \\ 67.25 \\ 177.41 \\ 0.14 \\ 0.011 \\ 0.07 \\ 0.03 \\ 0.12 \end{array}$	1720 33214 48 43 5 48	0.05 12.45 155.68 160.45 0.39 0.1 0.08 0.03 0.12	1720 1951443 563 38 33 5 38	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i5 profisafe_i5_host	67 35 84 84 65 80 28 14 88 28	5681 1697 2011 38 33 5 45 33	$\begin{array}{c} 0.26 \\ 0.07 \\ 45.84 \\ 62.23 \\ 170.83 \\ 0.17 \\ 0.09 \\ 0.08 \\ 0.03 \\ 0.12 \\ 0.08 \end{array}$	2574 1720 675 38 33 5 38 33	$\begin{array}{c} 0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.08 \end{array}$	$     \begin{array}{r}       17100 \\       675 \\       54 \\       49 \\       5 \\       54 \\       49 \\       49 \\       5     \end{array} $	$\begin{array}{c} 0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15 \\ 0.12 \\ 0.09 \\ 0.03 \\ 0.14 \\ 0.11 \end{array}$	$     \begin{array}{r}       17077 \\       675 \\       45 \\       33 \\       12 \\       45 \\       33     \end{array} $	$\begin{array}{c} 0.12 \\ 16.34 \\ 67.25 \\ 177.41 \\ 0.14 \\ 0.11 \\ 0.07 \\ 0.03 \\ 0.12 \\ 0.08 \end{array}$	1720 33214 48 43 5 48 43	$\begin{array}{c} 0.05 \\ 12.45 \\ 155.68 \\ 160.45 \\ 0.39 \\ 0.1 \\ 0.08 \\ 0.03 \\ 0.12 \\ 0.09 \end{array}$	1720 1951443 563 38 33 5 38 38 33	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host profisafe_i6	67 35 84 84 65 80 28 14 88 28 94	5681 1697 2011 38 33 5 45 33 45	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14 \end{array}$	2574 1720 675 38 33 5 38 33 38 33	$\begin{array}{c} 0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.13 \end{array}$	$ \begin{array}{r}     675 \\     54 \\     49 \\     5 \\     54 \\     49 \\     54 \\     49 \\     54 \\     49 \\     54 \\   \end{array} $	$\begin{array}{c} 0.12 \\ 40.88 \\ 158.22 \\ 157.93 \\ 0.15 \\ 0.12 \\ 0.09 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.16 \end{array}$	$   \begin{array}{r}     675 \\     675 \\     45 \\     33 \\     12 \\     45 \\     33 \\     45 \\   \end{array} $	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14 \end{array}$	$   \begin{array}{r}     1720 \\     33214 \\     48 \\     43 \\     5 \\     48 \\     43 \\     48 \\     43 \\     48 \\     43 \\     48 \\   \end{array} $	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14 \end{array}$	1720 1951443 563 38 33 5 38 33 38 33 38	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5_profisafe_i6 profisafe_i6_profisafe_i6_host	67 35 84 84 65 80 28 14 88 28 94 28	5681 1697 2011 38 33 5 45 33 45 33	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\end{array}$	2574 1720 675 38 33 5 38 33 38 33 38 33	$\begin{array}{c} 0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.13 \\ 0.09 \end{array}$	$ \begin{array}{r} 17100\\ 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 54\\ 49\\ 54\\ 49\end{array} $	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12 \end{array}$	$\begin{array}{c} 17077 \\ 675 \\ 45 \\ 33 \\ 12 \\ 45 \\ 33 \\ 45 \\ 33 \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\end{array}$	1720 33214 48 43 5 48 43 48 43 48 43	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\end{array}$	1720 1951443 563 38 33 5 38 33 38 33 38 33	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\end{array}$
fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_ic_host	67 35 84 84 65 80 28 14 88 28 94 28 78	5681 1697 2011 38 33 5 45 33 45 33 90	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\end{array}$	2574 1720 675 38 33 5 38 33 38 33 38 33 83	$\begin{array}{c} 0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.13 \\ 0.09 \\ 0.09 \\ 0.09 \end{array}$	$ \begin{array}{c} 17100\\ 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 54\\ 49\\ 54\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 4$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09 \end{array}$	$\begin{array}{c} 17077 \\ 675 \\ 45 \\ 33 \\ 12 \\ 45 \\ 33 \\ 45 \\ 33 \\ 56 \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11 \end{array}$	1720 33214 48 43 5 48 43 48 43 252	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\\ 0.14\end{array}$	1720 1951443 563 38 33 5 38 33 33 38 33 31	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	67 35 84 84 65 80 28 14 88 28 94 28 78 84	5681 1697 2011 38 33 5 45 33 45 33 45 33 90 83 90	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\end{array}$	2574 1720 675 38 33 5 38 33 38 33 38 33 83 83 83	$\begin{array}{c} 0.06 \\ 41.28 \\ 64.08 \\ 202.59 \\ 0.15 \\ 0.09 \\ 0.07 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.13 \\ 0.09 \\ 0.09 \\ 0.1 \end{array}$	$ \begin{array}{c} 17100\\ 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 54\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 49\\ 4$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11 \end{array}$	$\begin{array}{c} 17077\\ 675\\ 45\\ 33\\ 12\\ 45\\ 33\\ 45\\ 33\\ 56\\ 56\end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ \end{array}$	1720 33214 48 43 5 48 43 48 43 252 252	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\\ 0.14\\ 0.15\end{array}$	1720 1951443 563 38 33 5 38 33 38 33 38 33 38 33 31 31	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\\ 0.09\end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_ profisafe_i4_slave profisafe_i5_ profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave	67 35 84 84 65 80 28 14 88 28 94 28 78 84 84	5681 1697 2011 38 33 5 45 33 45 33 45 33 90 83 90 83 83	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1$	2574 1720 675 38 33 5 38 33 33 38 33 83 83 83 83 83 83 83 83	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.09\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1$	$ \begin{array}{c} 675\\54\\49\\5\\54\\49\\54\\49\\54\\49\\54\\49\\49\\49\\49\\49\\49\\49\end{array} $	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.1\end{array}$	$\begin{array}{c} 17077\\ 675\\ 45\\ 33\\ 12\\ 45\\ 33\\ 45\\ 33\\ 56\\ 56\\ 56\\ 45\\ \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.11\end{array}$	1720 33214 48 43 5 48 43 48 43 252 252 252 252 252 48	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.15\\ 0.12\\ \end{array}$	1720 1951443 563 38 33 5 38 33 38 33 33 31 31 31 31 31 31	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\\ 0.09\\ 0.09\\ 0.09\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4	67 35 84 84 84 65 80 28 14 88 28 78 84 84 84 90	5681 1697 2011 38 33 5 45 333 45 333 45 333 90 83 90 83 90 83 83 90	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1$	2574 1720 675 38 33 5 38 33 38 33 83 83 83 83 83 83 83 83 83	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.09\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1$	$ \begin{array}{c} 675\\54\\49\\5\\54\\49\\54\\49\\49\\49\\49\\49\\49\\54\\49\\54\\49\end{array} $	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.1\\ 0.14\\ \end{array}$	$\begin{array}{c} 17077 \\ 675 \\ 45 \\ 33 \\ 12 \\ 45 \\ 333 \\ 45 \\ 33 \\ 56 \\ 56 \\ 56 \\ 56 \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ \end{array}$	1720 33214 48 43 5 48 43 48 43 252 252 252 252 252 252 252 252 252 25	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.1\\ 0.14\\ 0.15\\ 0.15\\ 0.15\\ 0.12\\ 0.08\\ \end{array}$	1720 1951443 563 38 33 5 38 33 38 33 33 31 31 31 31 31 31	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.13\\ 0.13\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.09\\ 0.1\\ 0.1\\ 0.01\\ 0.02\\ 0.09\\ 0.09\\ 0.00\\ 0.01\\ 0.02\\ 0.00\\ $
fzelle rhone_alps tbed_ctct tbed_noclail verriegel4 profisafe_i4_host profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4 profisafe_o4_host	67 35 84 84 65 80 28 80 28 14 88 28 94 28 78 84 84 84 90 30	5681 1697 2011 38 33 5 45 333 45 333 45 333 90 83 83 90 83 83 90 388 333 5	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ \end{array}$	2574 1720 675 38 33 5 38 33 38 33 83 83 83 83 83 83 83 38 33 83 5	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.09\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ 0.04 \end{array}$	$\begin{array}{c} 675\\ 54\\ 49\\ 55\\ 49\\ 54\\ 49\\ 54\\ 49\\ 49\\ 49\\ 49\\ 54\\ 49\\ 54\\ 49\\ 55\end{array}$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.14\\ 0.1\\ 0.14\\ 0.1\end{array}$	$\begin{array}{c} 17077 \\ 675 \\ 45 \\ 33 \\ 12 \\ 45 \\ 33 \\ 45 \\ 33 \\ 56 \\ 56 \\ 56 \\ 45 \\ 33 \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.07\\ \end{array}$	$\begin{array}{c} 33214\\ 48\\ 43\\ 5\\ 48\\ 43\\ 48\\ 43\\ 252\\ 252\\ 252\\ 252\\ 252\\ 48\\ 43\\ 5\end{array}$	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.11\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.15\\ 0.12\\ 0.08\\ 0.04\\ \end{array}$	1720 1951443 563 38 33 5 38 33 38 33 33 33 33 33 31 31 31 31 31 33 35	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\\ 0.09\\ 0.09\\ 0.1\\ 0.08\end{array}$
fzelle rhone_alps tbed_ctct tbed_noclail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_bost profisafe_i5_host profisafe_i6_bost profisafe_inclusion_i4host profisafe_inclusion_o4bost profisafe_o4_host profisafe_o4_slave	67 35 84 84 65 28 14 88 28 94 28 89 4 28 88 84 88 84 84 90 30 16	5681 1697 2011 38 33 5 45 333 45 333 90 83 90 83 90 83 35 5 38	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ 0.04 \end{array}$	2574 1720 675 38 33 5 38 33 38 33 83 83 83 83 83 83 83 83 5 5 38	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.09\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ \end{array}$	$\begin{array}{c} 675\\ 54\\ 49\\ 55\\ 49\\ 54\\ 49\\ 54\\ 49\\ 49\\ 49\\ 49\\ 54\\ 49\\ 54\\ 49\\ 55\end{array}$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.02\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.04 \end{array}$	$\begin{array}{c} 17077 \\ 675 \\ 45 \\ 333 \\ 12 \\ 45 \\ 333 \\ 56 \\ 56 \\ 56 \\ 56 \\ 56 \\ 56 \\ $	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.11\\ 0.03\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.07\\ 0.05\\ \end{array}$	$\begin{array}{c} 33214\\ 48\\ 43\\ 5\\ 48\\ 43\\ 252\\ 252\\ 252\\ 252\\ 252\\ 48\\ 43\\ 5\\ 48\end{array}$	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.11\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.15\\ 0.15\\ 0.12\\ 0.08\\ 0.04\\ 0.13\end{array}$	1720 1951443 563 38 33 5 38 33 38 33 33 33 33 33 31 31 31 31 31 33 35	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\\ 0.09\\ 0.09\\ 0.09\\ 0.01\\ 0.08\\ 0.04\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_slave profisafe_o5	67 35 84 84 65 28 14 88 28 94 28 88 48 88 84 84 84 90 30 16 99	5681 1697 2011 38 33 5 45 33 45 33 45 33 90 83 90 83 90 83 83 33 5 38 33	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.04\\ 0.13\\ \end{array}$	2574 1720 675 38 33 5 38 33 33 83 83 83 83 83 83 83 83 83 83	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.09\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ 0.04\\ 0.12 \end{array}$	$\begin{array}{c} 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 59\\ 54\\ 49\\ 49\\ 49\\ 49\\ 49\\ 54\\ 49\\ 55\\ 54\end{array}$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.14\\ 0.11\\ 0.14\\ 0.11\\ 0.04\\ 0.16\end{array}$	$\begin{array}{c} 17077\\ 675\\ 45\\ 33\\ 12\\ 45\\ 33\\ 56\\ 56\\ 56\\ 56\\ 45\\ 333\\ 12\\ 45\\ \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.05\\ 0.13\\ \end{array}$	$\begin{array}{c} 33214\\ 48\\ 43\\ 5\\ 48\\ 43\\ 252\\ 252\\ 252\\ 252\\ 252\\ 48\\ 43\\ 5\\ 48\\ 43\end{array}$	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.11\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.15\\ 0.15\\ 0.12\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ \end{array}$	1720 1951443 563 38 33 5 38 33 33 31 31 31 31 31 38 33 5 38	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\\ 0.09\\ 0.09\\ 0.1\\ 0.08\\ 0.04\\ 0.13\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5_host	67 35 84 84 84 65 28 14 88 28 94 28 78 84 84 84 90 30 16 99 30	5681 1697 2011 38 33 5 45 33 45 33 45 33 90 83 90 83 90 83 83 33 5 38 33	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ 0.04\\ 0.13\\ 0.08\\ \end{array}$	2574 1720 675 38 33 38 33 38 33 83 83 83 83 83 83 38 33 83 38 33 83 38 33 83 38 33 83 38 33 83 38 83 38 83 38 83 83	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.07\\ 0.04\\ 0.12\\ 0.09\\ \end{array}$	$\begin{array}{c} 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 59\\ 54\\ 49\\ 49\\ 49\\ 49\\ 54\\ 49\\ 55\\ 54\\ 49\\ 55\\ 49\end{array}$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.14\\ 0.16\\ 0.12\\ 0.06\\ 0.1\end{array}$	$\begin{array}{c} 17077\\ 675\\ 45\\ 33\\ 12\\ 45\\ 33\\ 45\\ 33\\ 56\\ 56\\ 56\\ 45\\ 332\\ 12\\ 45\\ 33\\ 31\\ 12\\ 45\\ 33\\ 33\\ 31\\ 12\\ 45\\ 33\\ 33\\ 33\\ 33\\ 33\\ 33\\ 33\\ 33\\ 33\\ 3$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.13\\ 0.07\\ 0.05\\ 0.13\\ 0.08 \end{array}$	$\begin{array}{c} 33214\\ 48\\ 43\\ 5\\ 48\\ 43\\ 252\\ 252\\ 252\\ 252\\ 252\\ 48\\ 43\\ 5\\ 48\\ 43\\ 48\\ 43\\ 48\end{array}$	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.11\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.15\\ 0.15\\ 0.15\\ 0.15\\ 0.12\\ 0.08\\ 0.04\\ 0.03\\ 0.09\\ 0.15\\ \end{array}$	1720 1951443 563 38 33 5 38 33 38 33 31 31 31 31 31 31 38 33 5 38 33 33 33 33 31 31 31 31 31 31 33 33 33	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.11\\ 0.08\\ 0.09\\ 0.09\\ 0.09\\ 0.10\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_nocenil verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_slave profisafe_o5_host profisafe_o5_host profisafe_o6	67 35 84 84 84 85 80 28 14 88 28 94 288 788 844 900 300 166 999 300	5681 1697 2011 38 33 45 333 45 333 90 833 90 338 333 55 333 333 333 338 338 333 338 333 338 333 338 333 338 333 338 338 333 3388 3388 3388 3388 3388 3388 3388	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ 0.04\\ 0.13\\ 0.08\\ 0.14 \end{array}$	2574 1720 675 38 33 38 33 38 33 83 83 83 83 83 83 38 33 83 38 33 83 38 33 83 38 33 83 38 33 83 38 83 38 83 38 83 83	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.09\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ 0.04\\ 0.12\\ 0.09\\ 0.15\end{array}$	$\begin{array}{c} 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 54\\ 49\\ 49\\ 49\\ 49\\ 54\\ 49\\ 54\\ 49\\ 54\\ 49\\ 54\\ 49\\ 54\\ 49\\ 54\end{array}$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.14\\ 0.16\\ 0.14\\ 0.16\\ 0.14\\ 0.16\\ 0.11\\ 0.17\\ \end{array}$	$\begin{array}{c} 17077\\ 675\\ 45\\ 33\\ 12\\ 45\\ 33\\ 45\\ 33\\ 56\\ 56\\ 56\\ 45\\ 33\\ 12\\ 45\\ 33\\ 45\\ \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.11\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.07\\ 0.05\\ 0.08\\ 0.15\\ \end{array}$	$\begin{array}{c} 33214\\ 48\\ 43\\ 5\\ 48\\ 43\\ 252\\ 252\\ 252\\ 252\\ 252\\ 48\\ 43\\ 5\\ 48\\ 43\\ 48\\ 43\\ 48\\ 43\end{array}$	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.11\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.15\\ 0.12\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ 0.15\\ 0.11\end{array}$	1720 1951443 563 38 33 5 38 33 38 33 31 31 31 31 31 38 33 5 5 33 33 38 33 33 38 33 33 38 33 33 38 33 33	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\\ 0.09\\ 0.1\\ 0.08\\ 0.09\\ 0.1\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.14\\ \end{array}$
fzelle rhone_alps tbed_ctct tbed_noclerail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_profisafe_o4_ profisafe_o4_profisafe_o4_slave profisafe_o5_host profisafe_o5_host profisafe_o6_host	67 35 84 844 85 80 288 94 288 944 288 788 844 900 300 166 300	5681 1697 2011 38 33 45 333 45 333 90 833 90 338 333 55 333 333 333 338 338 333 338 333 338 333 338 333 338 333 338 338 333 3388 3388 3388 3388 3388 3388 3388	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.07\\ 0.04\\ 0.13\\ 0.08\\ 0.14\\ 0.09\end{array}$	2574 1720 675 38 33 5 38 33 83 83 83 83 83 83 83 83 83 83 83	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.09\\ 0.09\\ 0.13\\ 0.09\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.07\\ 0.04\\ 0.12\\ 0.09\\ 0.15\\ 0.09\end{array}$	$\begin{array}{c} 17100\\ 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 59\\ 54\\ 49\\ 49\\ 49\\ 59\\ 54\\ 49\\ 55\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 56\\ 54\\ 49\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.14\\ 0.11\\ 0.14\\ 0.1\\ 0.04\\ 0.16\\ 0.11\\ 0.17\\ 0.12 \end{array}$	$\begin{array}{c} 17077\\ 675\\ 45\\ 33\\ 12\\ 45\\ 33\\ 45\\ 33\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 45\\ 33\\ 12\\ 45\\ 33\\ 12\\ 45\\ 33\\ 33\\ 45\\ 33\\ 33\\ \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.07\\ 0.05\\ 0.13\\ 0.08\\ 0.15\\ 0.09\end{array}$	1720 33214 48 43 5 48 43 252 252 252 252 252 48 43 5 48 43 43 113	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.1\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.15\\ 0.12\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ 0.05\\ 0.11\\ \end{array}$	1720 1951443 563 38 33 5 38 33 31 31 31 31 31 31 31 31 38 33 33 8 33 33 38 33 33 38 33 33 38 33 33	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.13\\ 0.08\\ 0.09\\ 0.09\\ 0.09\\ 0.11\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.14\\ 0.09\end{array}$
fzelle rhone_alps tbed_ctct tbed_nocenail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5_profisafe_i6 profisafe_i6_profisafe_i6_host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_slave profisafe_o5_profisafe_o5_host profisafe_o6_host profisafe_o6_host ftechnik	$\begin{array}{c} 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ 36\\ \end{array}$	5681 1697 2011 38 33 5 45 333 45 333 90 83 90 83 33 5 38 33 38 33 38 33 38 33 38 33 38 33	$\begin{array}{c} 0.26\\ 0.07\\ 45.84\\ 62.23\\ 170.83\\ 0.17\\ 0.09\\ 0.08\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1\\ 0.1$	2574 1720 675 38 33 5 38 33 38 33 83 33 83 33 83 33 83 33 83 33 83 33 83 33 83 33 83 33 83 33 83 33 113	$\begin{array}{c} 0.06\\ 41.28\\ 64.08\\ 202.59\\ 0.15\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.03\\ 0.13\\ 0.09\\ 0.09\\ 0.13\\ 0.09\\ 0.09\\ 0.11\\ 0.11\\ 0.07\\ 0.04\\ 0.12\\ 0.09\\ 0.15\\ 0.09\\ 0.05\end{array}$	$\begin{array}{c} 17100\\ 675\\ 54\\ 49\\ 5\\ 54\\ 49\\ 59\\ 54\\ 49\\ 49\\ 49\\ 59\\ 54\\ 49\\ 55\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 59\\ 54\\ 49\\ 56\\ 54\\ 49\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56$	$\begin{array}{c} 0.12\\ 40.88\\ 158.22\\ 157.93\\ 0.15\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.09\\ 0.11\\ 0.14\\ 0.10\\ 0.12\\ 0.04\\ 0.16\\ 0.1\\ 0.12\\ 0.04\\ \end{array}$	$\begin{array}{c} 17077\\ 675\\ 45\\ 33\\ 12\\ 45\\ 33\\ 45\\ 33\\ 56\\ 56\\ 56\\ 56\\ 56\\ 56\\ 45\\ 33\\ 12\\ 45\\ 33\\ 12\\ 45\\ 33\\ 33\\ 45\\ 33\\ 33\\ \end{array}$	$\begin{array}{c} 0.12\\ 16.34\\ 67.25\\ 177.41\\ 0.14\\ 0.07\\ 0.03\\ 0.12\\ 0.08\\ 0.14\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.07\\ 0.05\\ 0.13\\ 0.08\\ 0.05\\ 0.09\\ 0.05\end{array}$	1720 33214 48 43 5 48 43 252 252 252 252 252 252 252 252 252 25	$\begin{array}{c} 0.05\\ 12.45\\ 155.68\\ 160.45\\ 0.39\\ 0.11\\ 0.08\\ 0.03\\ 0.12\\ 0.09\\ 0.04\\ 0.11\\ 0.14\\ 0.15\\ 0.12\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ 0.05\\ 0.11\\ 0.04\\ \end{array}$	1720 1951443 563 38 33 5 38 33 31 31 31 31 31 31 31 31 38 33 33 8 33 33 38 33 33 38 33 33 38 33 33	$\begin{array}{c} 0.18\\ 0.06\\ 7.69\\ 55.7\\ 56.03\\ 0.13\\ 0.09\\ 0.07\\ 0.03\\ 0.11\\ 0.08\\ 0.13\\ 0.1\\ 0.08\\ 0.09\\ 0.09\\ 0.01\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.13\\ 0.08\\ 0.04\\ 0.09\\ 0.05\\ \end{array}$

 Table 4.1

 PARALLEL CONTROLLABILITY CHECKER PREFERRING PLANTS

Model						llel che	cker, n	ot preferring plants MaxCommon MaxCom			М			
		А	11	Ear	0		ite					Ma		
				NotAc			ccept	Eve		Unc		Stat		
Name		States	Time	States	Time		Time	States	Time	States	Time	States	Time	
big_bmw	31	1065	0.06	207	0.05	350	0.05	442	0.06	167	0.05	5479	0.09	
fzelle	67	7919	0.2	16054	0.43	2240	0.19	2245	0.18	2311	0.2	2122	0.17	
rhone_alps		225085		1040434	4.88	56859	0.27	1544	0.06		0.12	56173	0.25	
tbed_ctct	84	119806	0.43	18391	0.14		27.25	18391	0.14	22298	0.15		52.09	
tbed_nocoll	84		22.06		478.75			184691		337945	1.57		231.03	
tbed_noderail	84		22.37		480.16			188302		339078	1.58		429.99	
verriegel4	65	3799	0.18	23384	0.33	597	0.13	23399	0.33		0.25	32833	0.42	
profisafe_i4	80	56	0.11	124	0.13	38	0.1	41	0.09	48	0.1	41	0.09	
profisafe_i4_host	28	48	0.08	112	0.1	33	0.07	36	0.07	43	0.08	36	0.06	
profisafe_i4_slave	14	8	0.03	12	0.03	5	0.03	5	0.03	5	0.03	5	0.02	
profisafe_i5	88	56	0.12	124	0.16	38	0.11	41	0.11	48	0.13	41	0.1	
profisafe_i5_host	28	48	0.1	112	0.11	33	0.08	36	0.07	43	0.1	36	0.08	
profisafe_i6	94	56	0.14	124	0.18	38	0.13	41	0.12	48	0.15	41	0.12	
profisafe_i6_host	28	48	0.1	112	0.13	33	0.1	36	0.09	43	0.12	36	0.08	
profisafe_inclusion_i4host	78	184	0.1	143	0.11	23	0.08	66 66	0.08	195	0.14	130	0.1	
profisafe_inclusion_o4host	84	184	0.11	143	0.12	23	0.08	66 66	0.09	195	0.14	130	0.11	
profisafe_inclusion_o4slave	84	184	0.11	143	0.12	23	0.08	66	0.09	195	0.14	130	0.1	
profisafe_04	90	56	0.11	124	0.15	38	0.11	41	0.1	48	0.12	41	0.1	
profisafe_o4_host	30	48	0.08	112	0.1	33 5	0.08	36	0.06	43	0.08	36	0.06	
profisafe_o4_slave	16	8	0.04	12	0.04		0.04	5	0.04	5	0.04	5	0.04	
profisafe_o5 profisafe_o5_host	99 30	56 48	0.14 0.09	124 112	0.18 0.12	38 33	$0.13 \\ 0.08$	41 36	$0.12 \\ 0.07$	48 43	0.14	41 36	$0.12 \\ 0.08$	
profisafe_00_nost profisafe_06	30 106	48 56	0.09	112	0.12	33 38		30 41		43 48	$0.1 \\ 0.16$	30 41	0.08 0.13	
profisafe_06_host	30	48	0.10	124	0.2	33 33	0.15 0.1	36	$0.14 \\ 0.09$	48	0.10	41 36	0.13	
ftechnik	36	48	0.11	112	0.15	33 113		113	0.09	43	0.11	113	0.09	
rhone_tough	50 61	115	17.38	115	77.38	115	$0.05 \\ 33.2$	115	23.09	115	9.11	115	28.6	
tbed_uncont	84		22.01		479.59		33.2 142.31		25.09 169.32		9.11 128.65		28.0 231.22	
Model	04	М		Mi		М	142.31 in	М		Oi		RelN		
model		Eve		NewE		Sta		Trans		0.	iie	Comr		
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time	
big_bmw	31	174	0.05	174	0.04	174	0.05	174	0.05	381	0.05	174	0.05	
fzelle	67	6183	0.28	2574	0.18	19728	0.48	16174	0.47	4464	0.22	2510	0.18	
rhone_alps	- 35													
		2134	0.08	1022	0.06	1308	0.07	1308	0.06	1720	0.06		0.06	
tbed_ctct	84	2134	46.1	1022	41.07	1308	40.97	1308	16.33	1720	12.42	1951443	$0.06 \\ 7.69$	
tbed_nocoll	84 84	2134	$46.1 \\ 17.95$	1022	$41.07 \\ 40.62$	1308	40.97 299.94	1308	$16.33 \\ 61.9$	1720	$12.42 \\ 155.23$	$1951443 \\ 306856$	$7.69 \\ 1.48$	
tbed_nocoll tbed_noderail	84 84 84		$46.1 \\ 17.95 \\ 235.13$		$41.07 \\ 40.62 \\ 281.84$		40.97 299.94 300.34		$16.33 \\ 61.9 \\ 403.78$		$12.42 \\ 155.23 \\ 160.95$	$1951443 \\ 306856 \\ 300259$	$7.69 \\ 1.48 \\ 1.38$	
tbed_nocoll tbed_noderail verriegel4	84 84 84 65	2011	$46.1 \\ 17.95 \\ 235.13 \\ 0.18$	675	$41.07 \\ 40.62 \\ 281.84 \\ 0.15$	675	40.97 299.94 300.34 0.16	675	$16.33 \\ 61.9 \\ 403.78 \\ 0.15$	33214	12.42 155.23 160.95 0.38	$1951443 \\ 306856 \\ 300259 \\ 563$	$7.69 \\ 1.48 \\ 1.38 \\ 0.13$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4	84 84 84 65 80	$2011 \\ 24$	$46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09$	$\begin{array}{c} 675\\ 24\end{array}$	41.07 40.62 281.84 0.15 0.09	$675 \\ 54$	40.97 299.94 300.34 0.16 0.12	$675 \\ 31$	$16.33 \\ 61.9 \\ 403.78 \\ 0.15 \\ 0.09$	$33214 \\ 48$	12.42 155.23 160.95 0.38 0.1	$1951443 \\ 306856 \\ 300259 \\ 563 \\ 24$	$7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host	84 84 65 80 28	2011 24 19	$\begin{array}{r} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \end{array}$	$675 \\ 24 \\ 19$	$\begin{array}{r} 41.07 \\ 40.62 \\ 281.84 \\ 0.15 \\ 0.09 \\ 0.06 \end{array}$	$675 \\ 54 \\ 49$	40.97 299.94 300.34 0.16 0.12 0.09	675 31 19	$16.33 \\ 61.9 \\ 403.78 \\ 0.15 \\ 0.09 \\ 0.06$	$33214 \\ 48 \\ 43$	12.42 155.23 160.95 0.38 0.1 0.08	$1951443 \\ 306856 \\ 300259 \\ 563 \\ 24 \\ 19$	7.69 1.48 1.38 0.13 0.09 0.05	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave	84 84 65 80 28 14	2011 24 19 5	$\begin{array}{r} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \end{array}$	$675 \\ 24 \\ 19 \\ 5$	$\begin{array}{c} 41.07 \\ 40.62 \\ 281.84 \\ 0.15 \\ 0.09 \\ 0.06 \\ 0.03 \end{array}$	$675 \\ 54 \\ 49 \\ 5$	$\begin{array}{r} 40.97\\299.94\\300.34\\0.16\\0.12\\0.09\\0.03\end{array}$	$675 \\ 31 \\ 19 \\ 12$	$16.33 \\ 61.9 \\ 403.78 \\ 0.15 \\ 0.09 \\ 0.06 \\ 0.04$	$33214 \\ 48 \\ 43 \\ 5$	$12.42 \\ 155.23 \\ 160.95 \\ 0.38 \\ 0.1 \\ 0.08 \\ 0.02 \\$	$1951443 \\ 306856 \\ 300259 \\ 563 \\ 24 \\ 19 \\ 5$	$7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave profisafe_i5	84 84 65 80 28 14 88	2011 24 19 5 31	$\begin{array}{r} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \end{array}$	$675 \\ 24 \\ 19 \\ 5 \\ 24$	$\begin{array}{c} 41.07 \\ 40.62 \\ 281.84 \\ 0.15 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.1 \end{array}$	$675 \\ 54 \\ 49 \\ 5 \\ 54 \\ 54$	$\begin{array}{r} 40.97\\299.94\\300.34\\0.16\\0.12\\0.09\\0.03\\0.14\end{array}$	$675 \\ 31 \\ 19 \\ 12 \\ 31$	$16.33 \\ 61.9 \\ 403.78 \\ 0.15 \\ 0.09 \\ 0.06 \\ 0.04 \\ 0.11$	$33214 \\ 48 \\ 43 \\ 5 \\ 48$	$12.42 \\ 155.23 \\ 160.95 \\ 0.38 \\ 0.1 \\ 0.08 \\ 0.02 \\ 0.12 \\$	$1951443 \\ 306856 \\ 300259 \\ 563 \\ 24 \\ 19 \\ 5 \\ 24$	$7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.1$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host	84 84 65 80 28 14 88 28	2011 24 19 5 31 19	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \end{array}$	$675 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 19 \\ 19 \\ 19 \\ 19 \\ 19 \\ 19 \\ 1$	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.1\\ 0.07\end{array}$	$675 \\ 54 \\ 49 \\ 5 \\ 54 \\ 49 \\ 49$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11 \end{array}$	675 31 19 12 31 19	$16.33 \\ 61.9 \\ 403.78 \\ 0.15 \\ 0.09 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\$	33214 $48$ $43$ $5$ $48$ $43$	$12.42 \\ 155.23 \\ 160.95 \\ 0.38 \\ 0.1 \\ 0.08 \\ 0.02 \\ 0.12 \\ 0.09 \\$	$1951443 \\ 306856 \\ 300259 \\ 563 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 19 \\ 5 \\ 24 \\ 19 \\ 19 \\ 19 \\ 19 \\ 10 \\ 10 \\ 10 \\ 10$	$7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.08$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5 profisafe_i6	84 84 65 80 28 14 88 28 94	2011 24 19 5 31 19 31	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \end{array}$	$675 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24$	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.1\\ 0.07\\ 0.12\\ \end{array}$	$675 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\end{array}$	$675 \\ 31 \\ 19 \\ 12 \\ 31 \\ 19 \\ 31 \\ 31$	$16.33 \\ 61.9 \\ 403.78 \\ 0.15 \\ 0.09 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\ 0.13$	33214 $48$ $43$ $5$ $48$ $43$ $43$ $48$	$12.42 \\ 155.23 \\ 160.95 \\ 0.38 \\ 0.1 \\ 0.08 \\ 0.02 \\ 0.12 \\ 0.09 \\ 0.14$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 24\end{array}$	$7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.08 \\ 0.12$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host profisafe_i6 profisafe_i6	84 84 65 80 28 14 88 28 94 28	2011 24 19 5 31 19 31 19 31	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \end{array}$	$675 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19$	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.1\\ 0.07\\ 0.12\\ 0.08\end{array}$	$675 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 54$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\end{array}$	$675 \\ 31 \\ 19 \\ 12 \\ 31 \\ 19 \\ 31 \\ 19 \\ 31 \\ 19$	$\begin{array}{c} 16.33 \\ 61.9 \\ 403.78 \\ 0.15 \\ 0.09 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.08 \end{array}$	33214 $48$ $43$ $5$ $48$ $43$ $43$ $48$ $43$	$12.42 \\ 155.23 \\ 160.95 \\ 0.38 \\ 0.1 \\ 0.08 \\ 0.02 \\ 0.12 \\ 0.09 \\ 0.14 \\ 0.11$	$\begin{array}{r} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 24\\ 19\\ 24\\ 19\end{array}$	$7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6 profisafe_i6_host profisafe_i6_host	84 84 65 80 28 14 88 28 94 28 78	2011 24 19 5 31 19 31 19 29	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \end{array}$	$675 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 83$	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.1\\ 0.07\\ 0.12\\ 0.08\\ 0.1\end{array}$	$675 \\ 54 \\ 49 \\ 5 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\end{array}$	$675 \\ 31 \\ 19 \\ 12 \\ 31 \\ 19 \\ 31 \\ 19 \\ 47 \\ 47 \\$	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\end{array}$	33214 $48$ $43$ $5$ $48$ $43$ $43$ $48$ $43$ $252$	$12.42 \\ 155.23 \\ 160.95 \\ 0.38 \\ 0.11 \\ 0.08 \\ 0.02 \\ 0.12 \\ 0.09 \\ 0.14 \\ 0.11 \\ 0.14$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 24\\ 19\\ 31\\ \end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.08 \\ 0.08 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host	84 84 65 80 28 14 88 28 94 28 78 84	2011 24 19 5 31 19 31 19 29 22	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \\ 0.08 \end{array}$	$675 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 83 \\ 83 \\ 83$	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.1\\ 0.07\\ 0.12\\ 0.08\\ 0.1\\ 0.11\\ \end{array}$	$675 \\ 54 \\ 49 \\ 5 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.1\end{array}$	675 31 19 12 31 19 31 19 47 47	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11 \end{array}$	33214 48 43 5 48 43 48 43 252 252	$12.42 \\ 155.23 \\ 160.95 \\ 0.38 \\ 0.11 \\ 0.08 \\ 0.02 \\ 0.12 \\ 0.09 \\ 0.14 \\ 0.11 \\ 0.14 \\ 0.$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 24\\ 19\\ 31\\ 31\\ 31\end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.09 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host	84 84 65 80 28 14 88 28 94 28 78 84 84	2011 24 19 5 31 19 31 19 29 22 29	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.09 \end{array}$	675 24 19 5 24 19 24 19 83 83 83	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.1\\ 0.11\\ 0.1\end{array}$	$675 \\ 54 \\ 49 \\ 5 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.11\\ \end{array}$	675 31 19 12 31 19 31 19 31 19 31 19 47 47 47	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.1\end{array}$	33214 48 43 5 48 43 48 43 252 252 252 252	$12.42\\155.23\\160.95\\0.38\\0.1\\0.08\\0.02\\0.12\\0.09\\0.14\\0.11\\0.14\\0.14\\0.15$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 31\\ 31\\ 31\\ 31\end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4	84 84 65 80 28 14 88 28 94 28 78 84 84 90	2011 24 19 5 31 19 31 19 29 22 29 22 29 24	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \end{array}$	675 24 19 5 24 19 24 19 83 83 83 24	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.11\\ 0.11\\ 0.11\\ 0.09\end{array}$	$675 \\ 54 \\ 49 \\ 5 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.11\\ 0.14 \end{array}$	675 31 19 12 31 19 31 19 47 47 47 31	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.1\\ 0.1\end{array}$	33214 $48$ $43$ $5$ $48$ $43$ $43$ $252$ $252$ $252$ $252$ $48$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.11\\ \end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 199\\ 5\\ 24\\ 19\\ 24\\ 19\\ 24\\ 19\\ 31\\ 31\\ 31\\ 24\\ \end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.1 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host	84 84 65 80 28 14 88 28 94 28 78 84 84 90 30	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 31 \\ 19 \\ 29 \\ 22 \\ 29 \\ 24 \\ 19$	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.06 \end{array}$	675 24 19 5 24 19 24 19 83 83 83 83 24 19	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.1\\ 0.07\\ 0.12\\ 0.08\\ 0.1\\ 0.11\\ 0.11\\ 0.1\\ 0.09\\ 0.06\end{array}$	$675 \\ 54 \\ 49 \\ 55 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.11\\ 0.14\\ 0.1\end{array}$	675 31 19 12 31 19 31 19 47 47 47 31 19	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.1\\ 0.1\\ 0.1\\ 0.05\end{array}$	33214 $48$ $43$ $5$ $48$ $43$ $252$ $252$ $252$ $252$ $48$ $43$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.14\\ 0.14\\ 0.14\\ 0.15\\ 0.11\\ 0.08\end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 24\\ 19\\ 31\\ 31\\ 31\\ 31\\ 24\\ 19\end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.06 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5 profisafe_i6 profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4 profisafe_o4_host profisafe_o4_slave	84 84 65 80 28 14 88 28 94 28 78 84 84 90 30 16	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 31 \\ 19 \\ 29 \\ 22 \\ 29 \\ 24 \\ 19 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ $	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.06 \\ 0.04 \end{array}$	$675 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 83 \\ 83 \\ 83 \\ 24 \\ 19 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ $	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.1\\ 0.11\\ 0.19\\ 0.06\\ 0.04\end{array}$	$675 \\ 54 \\ 49 \\ 55 \\ 54 \\ 49 \\ 49 \\ 49 \\ 4$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.11\\ 0.11\\ 0.14\\ 0.1\\ 0.04 \end{array}$	675 31 19 12 31 19 31 19 47 47 47 31 19 12	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.1\\ 0.1\\ 0.1\\ 0.05\\ 0.04 \end{array}$	33214 $48$ $43$ $5$ $48$ $43$ $43$ $252$ $252$ $252$ $252$ $48$ $43$ $5$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.14\\ 0.15\\ 0.11\\ 1.0.08\\ 0.04 \end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 244\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 31\\ 31\\ 31\\ 31\\ 24\\ 19\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\ 5\\$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.01 \\ 0.06 \\ 0.04 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4 profisafe_o4_host profisafe_o5	84 84 65 80 28 14 88 28 94 28 78 84 84 84 90 30 16 99	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 29 \\ 22 \\ 29 \\ 24 \\ 19 \\ 5 \\ 24$	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.08 \\ 0.09 \\ 0.06 \\ 0.04 \\ 0.12 \end{array}$	675 $24$ $19$ $5$ $24$ $19$ $24$ $19$ $83$ $83$ $83$ $83$ $24$ $19$ $5$ $24$	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.11\\ 0.11\\ 0.10\\ 0.09\\ 0.06\\ 0.04\\ 0.12\end{array}$	$675 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49 \\ 4$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.04\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.11\\ 0.11\\ 0.14\\ 0.11\\ 0.04\\ 0.15\end{array}$	675 31 19 12 31 19 47 47 47 47 31 199 231 31 31 199 32 31	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.1\\ 0.1\\ 0.15\\ 0.04\\ 0.12\end{array}$	33214 $48$ $433$ $5$ $48$ $433$ $252$ $252$ $252$ $252$ $252$ $488$ $433$ $5$ $48$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.14\\ 0.15\\ 0.11\\ 0.08\\ 0.04\\ 0.13\end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 31\\ 31\\ 31\\ 31\\ 31\\ 9\\ 5\\ 24\\ 19\\ 5\\ 24\end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.06 \\ 0.04 \\ 0.12 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5_profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_host profisafe_o5_profisafe_o5_host	84 84 65 80 28 14 88 28 94 28 78 84 84 84 90 30 16 99 30	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 31 \\ 19 \\ 29 \\ 22 \\ 29 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 19 \\ 19 \\ 19 \\ 19 \\ 19 \\ 19 \\ 1$	$\begin{array}{c} 46.1 \\ 17.95 \\ 235.13 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.06 \\ 0.04 \\ 0.12 \\ 0.07 \end{array}$	675 24 19 5 24 19 24 19 83 83 83 83 24 19 5 24 19 19 19 19 19 10 10 10 10 10 10 10 10 10 10 10 10 10	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.1\\ 0.07\\ 0.12\\ 0.08\\ 0.1\\ 0.11\\ 0.11\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.08\end{array}$	$egin{array}{c} 675 \\ 54 \\ 49 \\ 55 \\ 54 \\ 49 \\ 49 \\ 49 \\ 4$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.11\\ 0.11\\ 0.11\\ 0.14\\ 0.15\\ 0.11\\ 0.04\\ 0.15\\ 0.11\\ \end{array}$	675 31 19 31 19 31 19 47 47 47 47 31 19 12 31 19	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.1\\ 0.1\\ 0.05\\ 0.04\\ 0.12\\ 0.08\end{array}$	33214 $48$ $433$ $5$ $48$ $433$ $48$ $433$ $252$ $252$ $252$ $252$ $48$ $433$ $5$ $48$ $43$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.11\\ 0.14\\ 0.15\\ 0.11\\ 0.08\\ 0.04\\ 0.03\\ 0.09\end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 199\\ 5\\ 24\\ 19\\ 24\\ 19\\ 31\\ 31\\ 31\\ 31\\ 31\\ 24\\ 19\\ 5\\ 24\\ 19\\ 5\\ 24\\ 19\end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.05 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.012 \\ 0.06 \\ 0.04 \\ 0.12 \\ 0.07 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5_profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_host profisafe_o5_profisafe_o5_profisafe_o5_host profisafe_o6_host	$\begin{array}{c} 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ \end{array}$	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 31 \\ 19 \\ 29 \\ 22 \\ 29 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 1$	$\begin{array}{c} 46.1\\ 17.95\\ 235.13\\ 0.18\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.13\\ 0.09\\ 0.08\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.07\\ 0.14\end{array}$	675 24 19 5 24 19 24 19 83 83 83 24 19 5 24 19 24 19 24 24 24 24 24 24 24 24 24 24 24 24 24	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.11\\ 0.11\\ 0.11\\ 0.19\\ 0.06\\ 0.04\\ 0.12\\ 0.08\\ 0.13\end{array}$	$egin{array}{c} 675 \\ 54 \\ 49 \\ 554 \\ 49 \\ 54 \\ 49 \\ 49 \\ $	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.14\\ 0.15\\ 0.11\\ 0.15\\ 0.11\\ 0.18\end{array}$	675 31 19 31 19 477 477 477 311 199 122 311 199 312 313 193 312 312 311 193 312	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.1\\ 0.11\\ 0.1\\ 0.1\\ 0.05\\ 0.04\\ 0.12\\ 0.08\\ 0.14\end{array}$	33214 $48$ $433$ $5$ $48$ $433$ $43252$ $2522$ $2522$ $48$ $433$ $5$ $488$ $433$ $43$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.14\\ 0.14\\ 0.15\\ 0.11\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ 0.16\end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 199\\ 5\\ 24\\ 199\\ 24\\ 19\\ 311\\ 311\\ 31\\ 31\\ 24\\ 199\\ 5\\ 24\\ 199\\ 5\\ 24\\ 199\\ 24\end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.06 \\ 0.04 \\ 0.12 \\ 0.07 \\ 0.13 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6_ profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_ profisafe_o4_profisafe_o4_ profisafe_o5_host profisafe_o5_host profisafe_o6_ profisafe_o6_host	$\begin{array}{c} 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ \end{array}$	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 29 \\ 22 \\ 29 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 19 \\ 24 \\ 19 \\ 19 \\ 24 \\ 19 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10$	$\begin{array}{c} 46.1\\ 17.95\\ 235.13\\ 0.18\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.13\\ 0.09\\ 0.08\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.07\\ 0.14\\ 0.08\end{array}$	675 24 199 24 19 24 19 24 19 83 83 83 24 19 5 24 19 9 24	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.11\\ 0.11\\ 0.10\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.08\\ 0.13\\ 0.08\end{array}$	$egin{array}{c} 675 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49 \\ 4$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.14\\ 0.11\\ 0.14\\ 0.11\\ 0.04\\ 0.15\\ 0.11\\ 0.18\\ 0.13\end{array}$	675 31 19 31 19 31 19 47 47 47 31 19 12 31 19 31 19	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.12\\ 0.04\\ 0.12\\ 0.08\\ 0.14\\ 0.08\end{array}$	33214 $48$ $43$ $5$ $48$ $43$ $252$ $252$ $252$ $252$ $48$ $43$ $5$ $48$ $43$ $48$ $43$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.14\\ 0.14\\ 0.15\\ 0.11\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ 0.16\\ 0.11\\ \end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 199\\ 5\\ 24\\ 199\\ 24\\ 199\\ 311\\ 311\\ 311\\ 24\\ 199\\ 5\\ 24\\ 199\\ 5\\ 24\\ 199\\ 24\\ 199\\ 24\\ 199\\ 24\\ 19\end{array}$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.06 \\ 0.04 \\ 0.12 \\ 0.07 \\ 0.13 \\ 0.08 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6_ profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_ profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host ftechnik	$\begin{array}{c} 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ 36\\ \end{array}$	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 29 \\ 229 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 213 \\ 113 \\ 113 \\ 10 \\ 113 \\ 10 \\ 10 \\ 10$	$\begin{array}{c} 46.1\\ 17.95\\ 235.13\\ 0.18\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.13\\ 0.09\\ 0.08\\ 0.08\\ 0.08\\ 0.08\\ 0.09\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.07\\ 0.14\\ 0.08\\ 0.04\\ \end{array}$	675 24 19 5 24 19 24 19 83 83 83 24 19 5 24 19 24 19 24 24 24 24 24 24 24 24 24 24 24 24 24	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.11\\ 0.11\\ 0.11\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.08\\ 0.13\\ 0.08\\ 0.05\end{array}$	$egin{array}{c} 675 \\ 54 \\ 49 \\ 554 \\ 49 \\ 54 \\ 49 \\ 49 \\ $	$\begin{array}{r} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.14\\ 0.11\\ 0.04\\ 0.15\\ 0.11\\ 0.04\\ 0.15\\ 0.11\\ 0.04\\ 0.13\\ 0.04\end{array}$	$\begin{array}{c} 675\\ 31\\ 19\\ 12\\ 31\\ 19\\ 31\\ 19\\ 47\\ 47\\ 47\\ 31\\ 19\\ 12\\ 31\\ 19\\ 31\\ 19\\ 31\\ 19\\ 113\end{array}$	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.11\\ 0.15\\ 0.04\\ 0.12\\ 0.08\\ 0.04\\ 0.12\\ 0.08\\ 0.04\\ 0.08\\ 0.05\\ \end{array}$	$\begin{array}{r} 33214\\ 48\\ 43\\ 5\\ 48\\ 43\\ 48\\ 43\\ 252\\ 252\\ 252\\ 252\\ 48\\ 43\\ 5\\ 48\\ 43\\ 48\\ 43\\ 113\end{array}$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.14\\ 0.14\\ 0.15\\ 0.11\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ 0.16\\ 0.11\\ 0.04\end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 199\\ 5\\ 24\\ 199\\ 24\\ 199\\ 24\\ 19\\ 311\\ 311\\ 311\\ 24\\ 199\\ 5\\ 24\\ 199\\ 5\\ 24\\ 199\\ 113\\ 100\\ 100\\ 100\\ 100\\ 100\\ 100\\ 100$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.09 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.09 \\ 0.12 \\ 0.09 \\ 0.11 \\ 0.06 \\ 0.04 \\ 0.12 \\ 0.07 \\ 0.13 \\ 0.08 \\ 0.05 \end{array}$	
tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6_ profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_ profisafe_o4_profisafe_o4_ profisafe_o5_host profisafe_o5_host profisafe_o6_ profisafe_o6_host	$\begin{array}{c} 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ \end{array}$	$2011 \\ 24 \\ 19 \\ 5 \\ 31 \\ 19 \\ 29 \\ 22 \\ 29 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 113 \\$	$\begin{array}{c} 46.1\\ 17.95\\ 235.13\\ 0.18\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.13\\ 0.09\\ 0.08\\ 0.09\\ 0.08\\ 0.09\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.07\\ 0.14\\ 0.08\end{array}$	$\begin{array}{c} 675\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 83\\ 83\\ 83\\ 24\\ 19\\ 5\\ 24\\ 19\\ 24\\ 19\\ 24\\ 19\\ 113\\ \end{array}$	$\begin{array}{c} 41.07\\ 40.62\\ 281.84\\ 0.15\\ 0.09\\ 0.06\\ 0.03\\ 0.11\\ 0.07\\ 0.12\\ 0.08\\ 0.11\\ 0.11\\ 0.10\\ 0.09\\ 0.06\\ 0.04\\ 0.12\\ 0.08\\ 0.13\\ 0.08\end{array}$	$egin{array}{c} 675 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 49 \\ 4$	$\begin{array}{c} 40.97\\ 299.94\\ 300.34\\ 0.16\\ 0.12\\ 0.09\\ 0.03\\ 0.14\\ 0.11\\ 0.16\\ 0.12\\ 0.1\\ 0.11\\ 0.14\\ 0.11\\ 0.14\\ 0.11\\ 0.04\\ 0.15\\ 0.11\\ 0.18\\ 0.13\end{array}$	$\begin{array}{c} 675\\ 31\\ 19\\ 12\\ 31\\ 19\\ 31\\ 19\\ 47\\ 47\\ 47\\ 47\\ 31\\ 19\\ 12\\ 31\\ 19\\ 31\\ 19\\ 113\\ \end{array}$	$\begin{array}{c} 16.33\\ 61.9\\ 403.78\\ 0.15\\ 0.09\\ 0.06\\ 0.04\\ 0.11\\ 0.07\\ 0.13\\ 0.08\\ 0.09\\ 0.11\\ 0.11\\ 0.11\\ 0.11\\ 0.12\\ 0.04\\ 0.12\\ 0.08\\ 0.14\\ 0.08\end{array}$	33214 $48$ $433$ $5$ $48$ $433$ $252$ $252$ $252$ $252$ $48$ $433$ $5$ $48$ $433$ $113$	$\begin{array}{c} 12.42\\ 155.23\\ 160.95\\ 0.38\\ 0.1\\ 0.08\\ 0.02\\ 0.12\\ 0.09\\ 0.14\\ 0.14\\ 0.14\\ 0.15\\ 0.11\\ 0.08\\ 0.04\\ 0.13\\ 0.09\\ 0.16\\ 0.11\\ \end{array}$	$\begin{array}{c} 1951443\\ 306856\\ 300259\\ 563\\ 24\\ 199\\ 5\\ 24\\ 199\\ 24\\ 199\\ 24\\ 19\\ 311\\ 311\\ 311\\ 24\\ 199\\ 5\\ 24\\ 199\\ 5\\ 24\\ 199\\ 113\\ 100\\ 100\\ 100\\ 100\\ 100\\ 100\\ 100$	$\begin{array}{c} 7.69 \\ 1.48 \\ 1.38 \\ 0.13 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.08 \\ 0.12 \\ 0.08 \\ 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.06 \\ 0.04 \\ 0.12 \\ 0.07 \\ 0.13 \\ 0.08 \end{array}$	

 Table 4.2

 PARALLEL CONTROLLABILITY CHECKER NOT PREFERRING PLANTS

# Chapter 5 Culling Checker

As can be seen in the previous sections, what heuristic we use to decide which new automata to add to the composition can have a drastic effect on how long it will take to prove a model controllable and even on whether we will be able to prove a model as being controllable before running out of memory. This shows that it is important that, when we choose automata to be added into the composition, we choose the right ones. Thus, the idea behind the culling controllability checker is that, as we build up the composition of automata that we check for controllability, we also second guess some of the choices we made earlier on and attempt to remove from the composition those automata which aren't particularly good choices.

## 5.1 Algorithm

This algorithm is detailed in Figure 5.1. The basic concept here is that we use a regular modular controllability checker, but that, whenever we add a new automaton into the composition, we remember all the other automata which could have been added into the composition instead. This is so that whenever we add a new automata to the composition we can check to see if that automaton could have been used previously, and if it could, whether or not it would be worth while to remove the automaton we previously added into the composition.

## 5.2 Results

Again most of the things related to heuristics and such stated with respect to the standard modular checker apply here also. From looking at the results it seems that most of the time this checker does worse than the standard checker with the same heuristic and the same order of proving automata. There is however the notable exception of MaxCommonEvents and MaxCommonUncontrollable for tbed\_nocoll and tbed\_noderail. In Tables 3.8 and 5.2 we can see that the standard modular approach took more states than it needed to because of C equals the set of Controller automata in the model and P the set of Plant automata, S is the set of composed automata, and O is the set of automata we could of added to the composition at each step.

- 1. Set the set S and O as being empty.
- 2. if C is empty the model has been proven controllable. Otherwise, take an automaton from the set C and add it to S.
- 3. Check controllability of S using the monolithic method. Consider automata which are elements of C as controllers and all automata which are elements of P as plants.
- 4. If no counterexample for S was found go to 9. Otherwise set t to be the counterexample found by the controllability check.
- 5. Set the set N to contain all automata in P and C which would not accept the counterexample t. Take into consideration for all automata in C that specifications in addition to not accepting t must also not consider t as being a counterexample to their controller.
- 6. If N is empty then the model has been proven not controllable, and t represents a counterexample in the system. Otherwise pick an automaton n in N to add to S.
- 7. For all elements in O(a, mo) if  $n \in mo$  then check to see if the synchronous product of S is smaller without a if it is remove a from S and (a, mo) from O. In addition set N to equal the intersection of N and mo.
- 8. Add (n, N) to the list O then go to 3.
- 9. For all elements of S if they are also an element of C remove them from C and add them to P. Then go to 2.

Figure 5.1: Modular Controllability checking algorithm

choosing unnecessary automata and the culling approach did manage to remove unnecessary automata from the composition, taking significantly fewer states, and qsuggesting there may be some merits to this approach. However, there is still the unfortunate drawback that this approach can take significantly longer than others to work out that it will in fact fail.

Model		Culling language inclusion											
		А	.11	Ear	ly	La	ate	MaxCo	ommon			Μ	in
				NotAd	ccept	NotA	· · · · · · · · · · · · · · · · · · ·		ents	States		Events	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
profisafe_i4_slave	15	10519	0.95	1753	0.25	19377	1.14	12689	0.57	23441	1.24	1660	0.27
profisafe_o4_slave	17	7674	1.09	1664	0.43	23227	1.29	25475	1.09	28701	1.43	3243	0.68
big_bmw	32	1637	0.08	1637	0.06	2197	0.09	1637	0.09	1637	0.09	1985	0.07
ftechnik	37		17.79	4460133	119.07		136.2		445.22		63.2		147.92
tbed_nocoll	85		273.88		158.39		253.06	2301	1.6	2255	95.97		88.18
tbed_noderail	85		305.45		36.51		125.55		194.72		91.55		151.25
verriegel4	66	1680	0.06	1201	0.05	1680	0.06	1201	0.05	1680	0.06	1680	0.06
profisafe_i4_host	29	2730	0.71	5022	0.82	2321	0.51	4666	0.54	3081	0.76	2942	0.42
profisafe_o4_host	31	2730	0.7	5022	0.82	2321	0.52	4666	0.54	3081	0.77	2942	0.42
profisafe_i5_host	29	2928	0.82	5503	0.96	2519	0.6	5342	0.64	3368	0.89	3443	0.5
profisafe_o5_host	31	2928	0.81	5503	0.97	2519	0.6	5342	0.64	3368	0.89	3443	0.51
profisafe_i6_host	29	3126	0.93	5984	1.09	2717	0.69	6018	0.73	3655	1.02	3944	0.58
profisafe_o6_host	31	3126	0.93	5984	1.1	2717	0.69	6018	0.74	3655	1.03	3944	0.59
Model		Μ	in	Mi	n		lin	0	ne	Rel	Max		
		NewE	lvents	Stat	$\mathbf{es}$		sitions			Com	mon		
Name	Aut	States		States	Time	States	Time	States	Time	States			
profisafe_i4_slave	15	3636	0.45				0.26		0.95	4190	0.71		
profisafe_o4_slave	17	5051	0.65	22822	1.32	24632	1	7674	1.08	12240	1.36		
big_bmw	32	1985		1985	0.04	1985	0.06	1637	0.07	1985	0.05		
ftechnik	37		117.52		410.73		757.87		17.75		123.87		
tbed_nocoll	85		110.38		208.46		128.6		271.88		48.93		
$tbed_noderail$	85		108.32		110.12		83.86		304.9		139.91		
verriegel4	66	1680	0.06	2103		2103		1680	0.06	2103	0.07		
profisafe_i4_host	29	2101	0.52	-		-	0.42	2730	0.69	2101	0.52		
$profisafe_04_host$	31	2101	0.52	-		-	-		0.7	2101	0.52		
profisafe_i5_host	29	2337	0.59					2928	0.81	2337	0.58		
$profisafe_{05}host$	31	2337	0.59	2455		2066	-	2928	0.81	2337	0.6		
profisafe_i6_host	29	2573	0.66		0.64	2302	0.46		0.92	2573	0.67		
$profisafe_{0}6_{host}$	31	2573	0.67	2691	0.66	2302	0.46	3126	0.92	2573	0.67		

Table 5.1 CULLING LANGUAGE INCLUSION

Table 5.2											
CULLING CONTROLLABILITY CHECKER PREFERRING PLANTS, LARGEST											
CONTROLLER FIRST											

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Model				Cullir	ng checl	ær, prefe	rring p	lants, la	argest c	ontroll	er first		
$\begin begin beg$			А	.11		5								
big.hnw 31 10029 0.12 13970 0.17 13139 0.15 12017 0.13 11011 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 13160 0.12 1316 0.02 140 0.02 140 0.02 140 0.02 140 0.02 0.22 0.02 0.22 0.03 0.22 0.02 0.22 0.03 0.02 0.02								1						
facile         rol         232         0.23         1451         0.0.8         1309         0.21         1660         0.21         223         0.22         1223         0.21         1223         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.21         1233         0.22         233.33         verriagel4         65         2500         6.6         2921         0.41         10.09         10.11         1288         0.29         2929         0.42         10.09         10.1         10.05         89         0.12         136         0.05         89         0.13         60         136         0.05         89         0.13         60         136         0.05         89         0.13         160         10.1         148         0.09         10.1         89         0.12         36         0.03         5         0.03         5         0.03         5         0.03         60         0.03         5         0.03         60         0.03         5         0.03         60														
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profisafe i588980.16410.1940.15980.16940.14410.1profisafe i5host28360.07360.07890.12360.07890.12360.07profisafe i694980.18410.12940.18980.19940.16410.12profisafe i694980.18410.12940.18980.19940.16410.12profisafe inclusion i4host7818910.47140.318440.25930.125540.322720.13profisafe inclusion o4host8418910.427140.328440.26930.135540.322720.13profisafe o490940.13410.1940.14980.15940.13410.09profisafe o490940.13410.1940.14980.15940.13410.09profisafe o490940.13410.1940.14980.15940.13410.09profisafe o490940.13410.1940.14980.15940.13410.09profisafe o599410.11410.11940.17450.1194 <td>Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocell tbed_noderail verriegel4 profisafe_i4</td> <td><math>31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80</math></td> <td>Eve States 11797 1633 1142 1665 94</td> <td>Time 0.13 0.24 0.06 90.53 315.55 227.38 0.16 0.13</td> <td>NewE States 11797 1586 842 882 41</td> <td>Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09</td> <td>States 14265 2251 1142 5520413 882 94</td> <td><math display="block">\begin{array}{c} \overline{\text{Time}} \\ \hline 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \end{array}</math></td> <td>Trans States 11797 2096 1142 837 98</td> <td><math display="block">\begin{array}{c} \text{itions} \\ \hline \text{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \end{array}</math></td> <td>States 10929 2392 1142 28906 94</td> <td>Time 0.1 0.21 0.06 158.07 81.1 200.72 0.44 0.13</td> <td>Com States 11011 1544 842 328595 882 41</td> <td><math display="block">\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.6 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \end{array}</math></td>	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocell tbed_noderail verriegel4 profisafe_i4	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80$	Eve States 11797 1633 1142 1665 94	Time 0.13 0.24 0.06 90.53 315.55 227.38 0.16 0.13	NewE States 11797 1586 842 882 41	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09	States 14265 2251 1142 5520413 882 94	$\begin{array}{c} \overline{\text{Time}} \\ \hline 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \end{array}$	Trans States 11797 2096 1142 837 98	$\begin{array}{c} \text{itions} \\ \hline \text{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \end{array}$	States 10929 2392 1142 28906 94	Time 0.1 0.21 0.06 158.07 81.1 200.72 0.44 0.13	Com States 11011 1544 842 328595 882 41	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.6 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \end{array}$
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profisafe i6_host28360.08360.08890.14360.08890.13360.08profisafe inclusion i4host7818910.47140.318440.25930.125540.322720.13profisafe inclusion o4host8418870.427140.328440.27930.135540.322720.13profisafe inclusion o4slave8418910.427140.328440.26930.135540.322720.13profisafe o490940.13410.1940.14980.15940.13410.09profisafe o4 host30360.06360.06890.11360.06890.1360.06profisafe o4 slave1650.0450.0350.0390.0450.0350.03profisafe o5 host30360.07360.07890.12360.07890.12360.07profisafe o6106410.13410.11940.17450.11940.16410.12profisafe o6106410.13410.13940.19450.14940.18410.13profisafe o6 host30360.08360.08890.16 <td>Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5</td> <td><math>31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88</math></td> <td>Eve States 11797 1633 1142 1665 94 36 5 98</td> <td>Time 0.13 0.24 0.06 90.53 315.55 227.38 0.16 0.13 0.06 0.03 0.16</td> <td>NewE States 11797 1586 842 882 41 36 5 41</td> <td>Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.1</td> <td>State           14265           2251           1142           5520413           882           94           89           5           94           94           94           94</td> <td>Time 0.18 0.27 0.06 30.36 139.4 129.35 0.13 0.12 0.11 0.02 0.15</td> <td>Trans States 11797 2096 1142 837 98 36 9 98</td> <td><math display="block">\begin{array}{c} \text{itions} \\ \hline \text{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \end{array}</math></td> <td>States 10929 2392 1142 28906 94 89 5 94</td> <td>Time 0.1 0.21 0.06 158.07 81.1 200.72 0.44 0.13 0.1 0.02 0.14</td> <td>Com States 11011 1544 842 328595 8822 41 36 5 41</td> <td>mon Time 0.12 0.22 0.04 1.6 296.62 296.29 0.14 0.08 0.06 0.03 0.1</td>	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88$	Eve States 11797 1633 1142 1665 94 36 5 98	Time 0.13 0.24 0.06 90.53 315.55 227.38 0.16 0.13 0.06 0.03 0.16	NewE States 11797 1586 842 882 41 36 5 41	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.1	State           14265           2251           1142           5520413           882           94           89           5           94           94           94           94	Time 0.18 0.27 0.06 30.36 139.4 129.35 0.13 0.12 0.11 0.02 0.15	Trans States 11797 2096 1142 837 98 36 9 98	$\begin{array}{c} \text{itions} \\ \hline \text{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \end{array}$	States 10929 2392 1142 28906 94 89 5 94	Time 0.1 0.21 0.06 158.07 81.1 200.72 0.44 0.13 0.1 0.02 0.14	Com States 11011 1544 842 328595 8822 41 36 5 41	mon Time 0.12 0.22 0.04 1.6 296.62 296.29 0.14 0.08 0.06 0.03 0.1
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$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5_profisafe_i6_profisafe_i6_profisafe_i6_host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 2$	Eve States 11797 1633 1142 1665 94 36 5 98 36 98 36 98 36	ents Time 0.13 0.24 0.06 90.53 315.55 227.38 0.16 0.13 0.06 0.03 0.16 0.03 0.16 0.03 0.16 0.07 0.18 0.08	NewE States 11797 1586 842 41 36 5 41 366 41 366 41	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.03           0.11           0.03           0.12           0.08	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           94           89           94	Time           0.18           0.27           0.06           30.36           129.35           0.13           0.12           0.15           0.12           0.18	Trans States 11797 2096 1142 837 98 366 9 98 366 366 98 366 366 366 366 366 366 366 36	itions           Time           0.13           0.24           0.06           44.58           697.72           826.56           0.13           0.14           0.06           0.04           0.16           0.07           0.19           0.08	States 10929 2392 1142 28906 94 89 5 94 89 94 89	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.1 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \end{array}$	Com States 11011 1544 842 328595 882 41 366 5 41 366 41 366	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.6 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.1 \\ 0.07 \\ 0.12 \\ 0.08 \end{array}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5_host profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_i6_host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 78 \\$	Eve States 11797 1633 1142 1665 94 36 5 98 36 98 36 98 36 1891	Time           0.13           0.24           0.06           90.53           315.55           227.38           0.16           0.03           0.16           0.03           0.16           0.03           0.16           0.03           0.16           0.07           0.18           0.08           0.4	NewE States 11797 1586 842 41 366 5 41 366 41 366 714	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.1           0.07           0.12	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           89           94           89           94           89           94           89           94           89           89           89           89           89           89           89	Time           0.18           0.27           0.06           30.36           139.4           129.35           0.13           0.12           0.11           0.02           0.15           0.12           0.18           0.14           0.25	Trans States 11797 2096 1142 837 98 36 98 98 36 98 98 36 98 98 36 98 98 36 98 98 98 98 98 98 98 98 98 98	Time           0.13           0.24           0.06           44.58           697.72           826.56           0.13           0.14           0.06           0.04           0.10           0.13           0.14           0.06           0.04           0.16           0.07           0.19           0.08           0.12	States 10929 2392 1142 28906 94 89 5 94 89 94 89 94 89 554	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.1 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \end{array}$	Com States 11011 1544 842 328595 8822 41 366 5 41 366 41 366 272	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.6 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.1 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ \end{array}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_bost profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 84 \\ 84 \\ 84 \\ 84 \\ 84 \\ 84 \\ 8$	Eve States 11797 1633 1142 1665 94 36 5 98 36 98 36 98 36 1891 1887	Time           0.13           0.24           0.06           90.53           315.55           227.38           0.16           0.03           0.16           0.07           0.18           0.04	NewE States 11797 1586 842 41 366 41 366 41 366 714 714	Time           0.13           0.23           0.05           51.89           147.47           0.14           0.09           0.06           0.03           0.12           0.031           0.32	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           84           844	Time           0.18           0.27           0.06           30.36           139.4           129.35           0.13           0.12           0.11           0.02           0.15           0.12           0.14           0.25           0.27	Trans <u>States</u> 11797 2096 1142 8377 98 366 99 98 366 98 366 93 363 93	Time           0.13           0.24           0.06           44.58           697.72           826.56           0.13           0.14           0.06           0.04           0.16           0.07           0.19           0.12           0.13	States 10929 2392 1142 28906 94 89 5 94 89 94 89 94 554 554	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.11 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.132 \\ 0.32 \\ 0.32 \end{array}$	Com States 11011 1544 842 328595 882 41 366 5 41 366 41 366 272 272	$\begin{array}{c} \mbox{mon} \\ \hline \mbox{Time} \\ 0.12 \\ 0.02 \\ 0.04 \\ 1.6 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.1 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.13 \end{array}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Name big_bmw fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 94\\ 28\\ 78\\ 84\\ 84\\ 84\\ 84\\ \end{array}$	Eve States 11797 1633 1142 1665 94 36 5 98 36 98 36 1891 1887 1891	Time           0.13           0.24           0.06           90.53           315.55           227.38           0.16           0.03           0.16           0.07           0.18           0.42           0.42	NewE States 11797 1586 842 882 41 36 5 41 36 41 36 41 36 714 714	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.03           0.11           0.03           0.12           0.08           0.32           0.32	States           14265           2251           1142           5520413           882           94           89           5           94           89           54           894           89           54           89           94           89           54           89           844           844	$\begin{array}{c} \hline {\rm Time} \\ \hline {\rm Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.02 \\ 0.15 \\ 0.12 \\ 0.18 \\ 0.14 \\ 0.27 \\ 0.26 \\ \end{array}$	Trans States 11797 2096 1142 8377 98 366 98 98 366 98 98 366 98 98 366 98 98 98 366 98 98 98 98 98 98 98 98 98 98	Time           0.13           0.24           0.06           44.58           697.72           826.56           0.13           0.14           0.06           0.16           0.07           0.19           0.08           0.12           0.13	States 10929 2392 1142 28906 94 89 54 89 94 89 94 554 554	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.1 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \\ 0.33 \\ 0.33 \end{array}$	Com States 11011 1544 842 328595 882 41 366 5 41 366 41 366 41 366 272 272 272 272	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.03 \\ 0.14 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.14 \\ \end{array}$
profisafe o5         99         41         0.11         41         0.11         94         0.17         45         0.11         94         0.16         41         0.12           profisafe o5 host         30         36         0.07         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07           profisafe o6         host         30         36         0.08         36         0.08         89         0.16         36         0.08         89         0.14         36         0.08           ftechnik         36         483.01         183.51         743.3         669.58         45.72         422917         3.59           rhone_tough         61         11.88         11.89         8.64         8.71	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5 profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 84\\ 90\\ \end{array}$	Eve States 11797 1633 1142 1665 94 36 5 98 36 98 36 98 36 1891 1887 1891 94	Time           0.13           0.24           0.06           90.53           315.55           227.38           0.16           0.13           0.06           0.03           0.16           0.07           0.18           0.08           0.4           0.42           0.42	NewE States 11797 1586 842 882 41 36 5 41 36 41 36 41 36 41 3714 714 714 41	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.11           0.07           0.12           0.08           0.31           0.32           0.32	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           844           844           844           94	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.012 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.18 \\ 0.14 \\ 0.25 \\ 0.26 \\ 0.14 \\ \end{array}$	Trans States 11797 2096 1142 8377 98 366 98 98 366 98 366 98 366 98 366 98 366 98 366 98 366 98 366 98 98 366 98 98 366 98 98 366 98 98 98 98 98 98 98 98 98 98	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.13 \\ 0.15 \end{array}$	States 10929 2392 1142 28906 94 89 54 89 94 89 554 554 554 94	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.1 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \\ 0.33 \\ 0.13 \\ \end{array}$	Com States 11011 1544 842 328595 882 41 36 5 41 36 41 36 41 36 272 272 272 272 41	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \end{array}$
profisafe o5 host         30         36         0.07         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.12         36         0.07         89         0.13         36         0.08         36         0.08         36         0.08         36         0.08         36         0.08         36         0.08         36         0.08         36         0.08	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_profisafe_i5_profisafe_i5_profisafe_i5_profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_profisafe_o4_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 84\\ 90\\ 30\\ \end{array}$	Eve States 11797 1633 1142 1665 94 36 5 98 36 98 36 1891 1887 1891 1887 1891 94 36	Time           0.13           0.24           0.06           90.53           315.55           227.38           0.16           0.13           0.06           0.03           0.16           0.07           0.18           0.42           0.42           0.43           0.42	NewE States 11797 1586 842 41 366 5 41 366 41 366 41 366 714 714 714 316	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.11           0.07           0.12           0.08           0.31           0.32           0.1           0.06	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           844           844           94           89	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.02 \\ 0.15 \\ 0.12 \\ 0.18 \\ 0.14 \\ 0.25 \\ 0.27 \\ 0.26 \\ 0.14 \\ 0.11 \\ \end{array}$	Trans States 11797 2096 1142 837 98 36 99 98 366 98 368 98 368 98 368 98 368 98 368 98 368 98 368 98 368 98 368 98 368 98 93 98 98 98 98 98 98 98 98 98 98	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.13 \\ 0.15 \\ 0.06 \end{array}$	States 10929 2392 1142 28906 94 89 54 554 554 554 554 94 89	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.1 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \\ 0.33 \\ 0.33 \\ 0.13 \\ 0.1 \end{array}$	Com States 11011 1544 842 328595 882 41 36 5 41 36 41 36 272 272 272 272 272 41 36	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \end{array}$
profisafe o6         106         41         0.13         41         0.13         94         0.19         45         0.14         94         0.18         41         0.13           profisafe o6 host         30         36         0.08         36         0.08         89         0.16         36         0.08         89         0.14         94         0.18         41         0.13           profisafe o6 host         30         36         0.08         36         0.08         89         0.16         36         0.08         89         0.14         36         0.08           ftechnik         36         483.01         183.51         743.3         669.58         45.72         422917         3.59           rhone tough         61         11.88         11.89         8.64         8.71         8.78         65.82	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_alave profisafe_i5_profisafe_i5_profisafe_i6_profisafe_i6_profisafe_i6_profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_slave	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ \end{array}$	Eve States 11797 1633 1142 1665 94 366 5 98 366 1891 1887 1891 984 366 5	$\begin{array}{c} \text{ents} \\ \hline \text{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 90.53 \\ 315.55 \\ 227.38 \\ 0.16 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.16 \\ 0.07 \\ 0.18 \\ 0.08 \\ 0.4 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.43 \\ 0.06 \\ 0.04 \end{array}$	NewE States 11797 1586 842 41 366 5 411 366 411 366 714 714 411 366 5	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.11           0.07           0.12           0.08           0.31           0.32           0.11           0.06	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           89           89           89           89           89           89           89           89           89           89           89           89           89           89           89	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ \hline 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.02 \\ 0.15 \\ 0.12 \\ 0.18 \\ 0.14 \\ 0.25 \\ 0.27 \\ 0.26 \\ 0.14 \\ 0.11 \\ 0.03 \end{array}$	Trans States 11797 2096 1142 837 98 366 98 366 98 366 93 93 93 93 93 93 93 93 93 93	$\begin{array}{c} \text{itions} \\ \hline \text{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.13 \\ 0.15 \\ 0.06 \\ 0.04 \end{array}$	States 10929 2392 1142 28906 94 89 54 554 554 554 89 554 554 554 554 554 89 554 554 554 554 554 89 554 554 554 554 554 554 554 55	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.1 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \\ 0.33 \\ 0.13 \\ 0.1 \\ 0.03 \end{array}$	$\begin{array}{c} \text{Com} \\ \hline \text{States} \\ \hline 11011 \\ 1544 \\ 842 \\ 328595 \\ \hline \\ 882 \\ 411 \\ 366 \\ 5 \\ 411 \\ 366 \\ 272 \\ 272 \\ 272 \\ 272 \\ 272 \\ 411 \\ 366 \\ 5 \\ \hline \end{array}$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.6 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \end{array}$
profisafe_06_host         30         36         0.08         36         0.08         89         0.16         36         0.08         89         0.14         36         0.08           ftechnik         36         483.01         183.51         743.3         669.58         45.72         422917         3.59           rhone_tough         61         11.88         11.89         8.64         8.71         8.78         65.82	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_i04_host profisafe_o4_host profisafe_o5_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\end{array}$	$\frac{\text{Eve}}{\text{States}}$ $\frac{\text{States}}{11797}$ $1633$ $1142$ $1665$ $94$ $366$ $5$ $98$ $366$ $1891$ $1887$ $1891$ $94$ $366$ $5$ $41$	$\begin{array}{c} \text{ints} \\ \hline \textbf{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 90.53 \\ 315.55 \\ 227.38 \\ 0.16 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.16 \\ 0.07 \\ 0.18 \\ 0.04 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.44 \\ 0.42 \\ 0.42 \\ 0.13 \\ 0.06 \\ 0.04 \\ 0.11 \\ \end{array}$	NewE States 11797 1586 842 41 366 41 366 41 366 714 714 714 41 36 5 41	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.11           0.07           0.12           0.32           0.31           0.32           0.31           0.32           0.13	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           5           94	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.02 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.11 \\ 0.25 \\ 0.27 \\ 0.26 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.17 \\ \end{array}$	Trans           States           11797           2096           1142           8377           98           366           93           93           93           93           93           94           366           93           94           36           93           94           36           93           94           36           97           98           36           99           45	$\begin{array}{c} \mbox{itions} \\ \hline \mbox{Time} \\ \hline \mbox{0.13} \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.13 \\ 0.15 \\ 0.06 \\ 0.04 \\ 0.11 \\ \end{array}$	States 10929 2392 1142 28906 94 89 54 554 554 554 554 94 89 5 94	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.1 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.32 \\ 0.32 \\ 0.33 \\ 0.13 \\ 0.1 \\ 0.03 \\ 0.16 \\ \end{array}$	$\begin{array}{c} \text{Com} \\ \hline \text{States} \\ 11011 \\ 1544 \\ 842 \\ 328595 \\ \hline \\ 328595 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 272 \\ 272 \\ 272 \\ 272 \\ 272 \\ 272 \\ 272 \\ 272 \\ 411 \\ 366 \\ 5 \\ 41 \\ \end{array}$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.12 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.12 \\ \end{array}$
thechnik         36         483.01         183.51         743.3         669.58         45.72         422917         3.59           rhone_tough         61         11.88         11.89         8.64         8.71         8.78         65.82	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocent verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o5_profisafe_o5_profisafe_o5_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 84\\ 88\\ 84\\ 84\\ 90\\ 16\\ 99\\ 30\\ \end{array}$	$\frac{\text{Eve}}{\text{States}}$ $\frac{\text{States}}{11797}$ $1633$ $1142$ $1665$ $94$ $366$ $5$ $98$ $366$ $1891$ $1887$ $1891$ $94$ $366$ $5$ $41$ $36$	$\begin{array}{c} \text{ents} \\ \hline \textbf{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 90.53 \\ 315.55 \\ 227.38 \\ 0.16 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.16 \\ 0.07 \\ 0.18 \\ 0.08 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.13 \\ 0.06 \\ 0.04 \\ 0.011 \\ 0.07 \\ \end{array}$	NewE           States           11797           1586           842           41           366           41           366           714           714           714           366           5           41           36           714           36           5           41           36           714           36           5           41           36	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.033           0.11           0.07           0.12           0.08           0.31           0.32           0.31           0.32           0.31	States           14265           2251           1142           5520413           882           94           899           5           94           89           94           89           94           89           5           94           89           5           94           89           844           844           84           84           84           84           84           84           84           84           84           84           84           84           84           84           84           84           89           5           94           89           5           94           89           5           94           89           5           84           89	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.13 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.14 \\ 0.25 \\ 0.27 \\ 0.26 \\ 0.14 \\ 0.11 \\ 0.017 \\ 0.12 \\ \end{array}$	Trans           States           11797           2096           1142           8377           98           366           93           93           93           98           366           93           94           36           93           94           36           93           94           36           93           94           36           93           94           36           93           945           36	$\begin{array}{c} \mbox{itions} \\ \hline \mbox{Time} \\ \hline \mbox{0.13} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.15 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \end{array}$	$\begin{array}{c} {\rm States}\\ 10929\\ 2392\\ 1142\\ 28906\\ 94\\ 89\\ 5\\ 94\\ 89\\ 554\\ 554\\ 554\\ 554\\ 554\\ 554\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 94\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 5\\ 89\\ 5\\ 89\\ 5\\ 89\\ 5\\ 89\\ 5\\ 89\\ 5\\ 89\\ 5\\ 89\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 89\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 5\\ 89\\ 89\\ 5\\ 89\\ 89\\ 89\\ 89\\ 89\\ 5\\ 89\\ 89\\ 89\\ 5\\ 89\\ 89\\ 89\\ 89\\ 5\\ 89\\ 89\\ 89\\ 89\\ 89\\ 89\\ 89\\ 89\\ 89\\ 89$	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.11 \\ 0.02 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \\ 0.33 \\ 0.13 \\ 0.13 \\ 0.10 \\ 0.036 \\ 0.12 \end{array}$	$\begin{array}{c} \text{Com} \\ \hline \text{States} \\ 11011 \\ 1544 \\ 842 \\ 328595 \\ \hline \\ 882 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 272 \\ 272 \\ 272 \\ 272 \\ 272 \\ 272 \\ 411 \\ 366 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 5 \\ 411 \\ 366 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.03 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.12 \\ 0.07 \\ \end{array}$
rhone_tough 61 11.88 11.89 8.64 8.71 8.78 65.82	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5 profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_o4_host profisafe_o5_profisafe_o5_host profisafe_o6_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 84\\ 28\\ 78\\ 84\\ 88\\ 84\\ 90\\ 300\\ 16\\ 99\\ 30\\ 106\\ \end{array}$	$\frac{\text{Eve}}{\text{States}}$ $\frac{\text{States}}{11797}$ $1633$ $1142$ $1665$ $94$ $366$ $58$ $366$ $988$ $366$ $1891$ $1887$ $1891$ $94$ $366$ $5$ $411$ $366$ $41$	$\begin{array}{c} \text{ents} \\ \hline \textbf{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 90.53 \\ 315.55 \\ 227.38 \\ 0.16 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.16 \\ 0.07 \\ 0.18 \\ 0.08 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.13 \\ 0.06 \\ 0.04 \\ 0.01 \\ 0.07 \\ 0.13 \end{array}$	NewE States 11797 1586 842 41 36 5 41 36 41 36 714 714 41 36 5 41 36 41 36 41 41 36 41	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.11           0.07           0.12           0.08           0.31           0.32           0.32           0.11           0.066           0.031           0.32           0.31           0.32           0.31           0.32           0.32           0.31           0.32           0.31           0.32           0.31           0.32	States           14265           2251           1142           5520413           882           94           89           5           94           89           54           894           89           5           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.02 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.18 \\ 0.14 \\ 0.27 \\ 0.26 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.12 \\ 0.19 \\ 0.12 \\ 0.19 \end{array}$	$\begin{array}{r} {\rm Trans} \\ \hline {\rm States} \\ 11797 \\ 2096 \\ 1142 \\ \\ 837 \\ 98 \\ 36 \\ 98 \\ 36 \\ 98 \\ 36 \\ 98 \\ 36 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 94 \\ 55 \\ 36 \\ 45 \\ \end{array}$	$\begin{array}{c} \mbox{itions} \\ \hline \mbox{Time} \\ \hline \mbox{0.13} \\ 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.15 \\ 0.06 \\ 0.04 \\ 0.017 \\ 0.14 \\ \end{array}$	States 10929 2392 1142 28906 94 89 54 89 554 554 554 94 89 554 94 89 554 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 94 89 95 95 94 89 95 95 94 89 95 95 94 89 95 95 94 89 95 95 94 89 95 95 94 89 95 554 89 95 94 89 95 554 89 94 89 95 94 80 95 94 80 95 94 80 95 94 80 95 80 80 80 80 80 80 80 80 80 80	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.12 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \\ 0.33 \\ 0.13 \\ 0.13 \\ 0.1 \\ 0.03 \\ 0.16 \\ 0.12 \\ 0.18 \\ \end{array}$	$\begin{array}{c} \text{Com} \\ \hline \text{States} \\ 11011 \\ 1544 \\ 842 \\ 328595 \\ \hline \\ 882 \\ 41 \\ 366 \\ 5 \\ 411 \\ 366 \\ 411 \\ 366 \\ 272 \\ 272 \\ 272 \\ 411 \\ 366 \\ 5 \\ 411 \\ 366 \\ 41 \\ \hline \\ 416 \\ 41 \\ \hline \\ \end{array}$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.12 \\ 0.07 \\ 0.13 \\ \end{array}$
	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_profisafe_i5_profisafe_i5_profisafe_i6_profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o4_host profisafe_o5_profisafe_o5_profisafe_o5_profisafe_o6_profisafe_o6_profisafe_o6_profisafe_o6_profisafe_o6_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 300\\ 166\\ 99\\ 30\\ 106\\ 30\\ \end{array}$	$\frac{\text{Eve}}{\text{States}}$ $\frac{\text{States}}{11797}$ $1633$ $1142$ $1665$ $94$ $366$ $58$ $366$ $988$ $366$ $1891$ $1887$ $1891$ $94$ $366$ $5$ $411$ $366$ $41$	$\begin{array}{c} \text{ents} \\ \hline \textbf{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 90.53 \\ 315.55 \\ 227.38 \\ 0.16 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.16 \\ 0.07 \\ 0.18 \\ 0.08 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.43 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.08 \end{array}$	$\begin{array}{r} {\rm NewE}\\ {\rm States}\\ 11797\\ 1586\\ 842\\ 882\\ 41\\ 366\\ 5\\ 411\\ 366\\ 714\\ 714\\ 714\\ 714\\ 366\\ 5\\ 411\\ 366\\ 41\\ 366\\ 410\\ 410\\ 410\\ 410\\ 410\\ 410\\ 410\\ 410$	$\begin{array}{r} \hline {\bf Vients} \\ \hline {\bf Time} \\ \hline 0.13 \\ 0.23 \\ 0.05 \\ 51.89 \\ 140.13 \\ 147.47 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.31 \\ 0.32 \\ 0.32 \\ 0.11 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.08 \end{array}$	States           14265           2251           1142           5520413           882           94           89           5           94           89           54           894           89           5           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.36 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.02 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.16 \\ 0.14 \\ 0.25 \\ 0.26 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.17 \\ 0.26 \\ 0.19 \\ 0.16 \\ \end{array}$	$\begin{array}{r} {\rm Trans} \\ \hline {\rm States} \\ 11797 \\ 2096 \\ 1142 \\ \\ 837 \\ 98 \\ 36 \\ 98 \\ 36 \\ 98 \\ 36 \\ 98 \\ 36 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 94 \\ 5 \\ 36 \\ 45 \\ 36 \\ \end{array}$	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline 0.13 \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.06 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.15 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\ 0.14 \\ 0.08 \end{array}$	States 10929 2392 1142 28906 94 89 54 554 554 94 89 55 94 89 95 89 94 89 89 89 89 89 89 89 89 89 89	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.12 \\ 0.014 \\ 0.12 \\ 0.14 \\ 0.12 \\ 0.33 \\ 0.13 \\ 0.33 \\ 0.13 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.16 \\ 0.18 \\ 0.14 \\ \end{array}$	$\begin{array}{c} \text{Com} \\ \hline \text{States} \\ 11011 \\ 1544 \\ 842 \\ 328595 \\ \hline \\ 882 \\ 411 \\ 366 \\ 5 \\ 411 \\ 366 \\ 272 \\ 272 \\ 272 \\ 272 \\ 2772 \\ 411 \\ 366 \\ 5 \\ 411 \\ 366 \\ 411 \\$	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.12 \\ 0.07 \\ 0.13 \\ 0.08 \end{array}$
	Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_profisafe_i5_profisafe_i5_profisafe_i5_profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_profisafe_o4_profisafe_o4_slave profisafe_o5_profisafe_o5_profisafe_o5_host profisafe_o6_host profisafe_o6_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 84\\ 65\\ 28\\ 84\\ 88\\ 28\\ 94\\ 28\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ 106\\ 30\\ 36\\ \end{array}$	$\frac{\text{Eve}}{\text{States}}$ $\frac{\text{States}}{11797}$ $1633$ $1142$ $1665$ $94$ $366$ $58$ $366$ $988$ $366$ $1891$ $1887$ $1891$ $94$ $366$ $5$ $411$ $366$ $41$	$\begin{array}{c} \text{ents} \\ \hline \text{Time} \\ 0.13 \\ 0.24 \\ 0.06 \\ 90.53 \\ 315.55 \\ 227.38 \\ 0.16 \\ 0.13 \\ 0.06 \\ 0.03 \\ 0.16 \\ 0.07 \\ 0.18 \\ 0.08 \\ 0.42 \\ 0.42 \\ 0.42 \\ 0.43 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\ 0.13 \\ 0.08 \\ 483.01 \\ \end{array}$	NewE States 11797 1586 842 41 366 51 41 366 411 366 714 714 411 366 5 411 366 411 366 411 366 5 411 366 5 411 366 411 366 411 366 411 366 412 366 411 366 412 366 411 366 55 411 366 55 411 366 55 411 366 55 411 366 55 411 366 55 411 366 55 411 366 55 411 366 55 411 366 55 411 366 55 411 366 411 366 55 411 366 411 366 55 411 366 411 366 411 366 411 366 411 366 411 366	Time           0.13           0.23           0.05           51.89           140.13           147.47           0.14           0.09           0.06           0.03           0.11           0.07           0.12           0.08           0.31           0.32           0.11           0.06           0.03           0.11           0.06           133.0.08           183.51	States           14265           2251           1142           5520413           882           94           89           5           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89           94           89	$\begin{array}{c} \hline \text{res} \\ \hline \hline \text{Time} \\ 0.18 \\ 0.27 \\ 0.06 \\ 30.366 \\ 139.4 \\ 129.35 \\ 0.13 \\ 0.12 \\ 0.11 \\ 0.025 \\ 0.15 \\ 0.12 \\ 0.15 \\ 0.12 \\ 0.18 \\ 0.14 \\ 0.25 \\ 0.27 \\ 0.26 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.17 \\ 0.12 \\ 0.19 \\ 0.16 \\ \hline 743.3 \end{array}$	$\begin{array}{r} {\rm Trans} \\ {\rm States} \\ 11797 \\ 2096 \\ 1142 \\ \\ 837 \\ 98 \\ 36 \\ 98 \\ 36 \\ 98 \\ 36 \\ 98 \\ 36 \\ 98 \\ 36 \\ 93 \\ 93 \\ 93 \\ 93 \\ 98 \\ 36 \\ 99 \\ 45 \\ 36 \\ 36 \\ 45 \\ 36 \\ 36 \\ 45 \\ 36 \\ 36 \\ 45 \\ 36 \\ 36 \\ 45 \\ 36 \\ 36 \\ 45 \\ 36 \\ 36 \\ 45 \\ 36 \\$	$\begin{array}{c} \text{itions} \\ \hline \textbf{Time} \\ \hline \textbf{0.13} \\ 0.24 \\ 0.06 \\ 44.58 \\ 697.72 \\ 826.56 \\ 0.13 \\ 0.14 \\ 0.06 \\ 0.04 \\ 0.16 \\ 0.07 \\ 0.19 \\ 0.08 \\ 0.12 \\ 0.13 \\ 0.15 \\ 0.06 \\ 0.04 \\ 0.11 \\ 0.07 \\ 0.14 \\ 0.08 \\ 669.58 \end{array}$	States 10929 2392 1142 28906 94 89 54 554 554 554 554 94 89 5 94 89 94 89 5 94 89 5 94 89 89 89 89 89 89 89 89 89 89	$\begin{array}{c} \text{Time} \\ 0.1 \\ 0.21 \\ 0.06 \\ 158.07 \\ 81.1 \\ 200.72 \\ 0.44 \\ 0.13 \\ 0.12 \\ 0.14 \\ 0.12 \\ 0.16 \\ 0.13 \\ 0.32 \\ 0.33 \\ 0.13 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.12 \\ 0.18 \\ 0.14 \\ 45.72 \end{array}$	$\begin{array}{c} \text{Com} \\ \hline \text{States} \\ 11011 \\ 1544 \\ 842 \\ 328595 \\ \hline \\ 882 \\ 411 \\ 366 \\ 51 \\ 411 \\ 366 \\ 411 \\ 366 \\ 55 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 411 \\ 366 \\ 412 \\ 917 \\ 710 \\ 810 $	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.12 \\ 0.22 \\ 0.04 \\ 1.66 \\ 296.62 \\ 296.29 \\ 0.14 \\ 0.08 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.08 \\ 0.13 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.12 \\ 0.07 \\ 0.13 \\ 0.14 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.12 \\ 0.07 \\ 0.13 \\ 0.08 \\ 3.59 \end{array}$

Model				Cullir	ng checl	ker, not	preferr	ing plant	s, large	est control	ler first		
		А	.11	Ea	rly	L	ate	MaxCo	mmon	MaxCor	nmon	Ma	
				NotA			Accept	Eve	nts	Unco		Stat	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	10929	0.1	4825	0.11	9718	0.1	355	0.06	168	0.04	13160	0.15
fzelle	67	2392	0.24	27576	0.31	1309	0.2	1660	0.22	2293	0.24	2263	0.22
rhone_alps	35	1142	0.06	20214	0.19	16231	0.13	16086	0.11	5254	0.14	16986	0.14
tbed_ctct	84		157.87	21503	0.17		20.63	21503	0.17	22670	0.22		63.23
tbed_nocoll	84		81.62		571.92		106.39	143639	1.15		410.83		224.93
tbed_noderail	84		201.48		586.78		146.09	144789	1.19		467.51		223.76
verriegel4	65	28906	0.47	33960	0.55	628	0.13	21431	0.35	11203		33138	0.52
profisafe_i4	80	94	0.17	86	0.13	94	0.13	41	0.08	47	0.11	41	0.08
profisafe_i4_host	28	89	0.1	77	0.09	89	0.1	36	0.06	42	0.09	36	0.06
profisafe_i4_slave	14	5	0.02	9	0.03	5	0.03	5	0.02	5	0.03	5	0.03
profisafe_i5	88	94	0.15	86	0.23	94	0.15	41	0.1	47	0.13	41	0.09
profisafe_i5_host	28	89	0.11	77	0.11	89	0.12	36	0.07	42	0.1	36	0.07
profisafe_i6	94	94	0.17	86	0.19	94	0.18	41	0.12	47	0.15	41	0.11
profisafe_i6_host	28	89	0.13	77	0.12	89	0.14	36	0.08	42	0.11	36	0.08
profisafe_inclusion_i4host	78	554	0.34	104	0.11	48	0.08	62	0.09	323	0.2	118	0.09
profisafe_inclusion_o4host	84	554	0.34	104	0.12	48	0.09	62 62	0.09	323	0.22	118	0.1
profisafe_inclusion_o4slave	84 90	554	0.34	104	0.12 0.12	48 94	0.09	62 41	0.09	323	0.22	118 41	0.1
profisafe_o4	90 30	94 89	0.15	86 77			0.13	41 36	0.09 0.06	47 42	0.13 0.09	41 36	0.09
profisafe_04_host profisafe_04_slave		89 5	0.1	77 9	0.1 0.04	89 5	$0.11 \\ 0.03$		0.06	42 5	0.09		0.06
profisate_04_slave profisafe_05	16 99	5 94	$0.03 \\ 0.15$	9 86	0.04 0.21	5 94	0.03	5 41	0.04	5 47	0.03	5 41	$0.03 \\ 0.11$
profisafe_05_host	99 30	94 89	0.15	80 77	0.21	94 89	0.10	41 36	0.11	47 42	0.14	41 36	0.11
profisafe_06	106	89 94	0.15	86	0.11	89 94	0.12	50 41	0.07	42 47	0.16	30 41	0.07
profisafe_o6_host	30	94 89	0.21	80 77	0.19	94 89	0.19	36	0.13	47 42	0.10	36	0.13
ftechnik	36	09	45.95	235864	3.24		1033.98	2156487	10.49	31549956	158.24	50	259.57
rhone_tough	61		45.55	200004	24.83		50.63	2100407	81.83	51545550	8.8		14.01
tbed_uncont	84		60.41		573.15		105.87		200.49		93.64		143.35
Model	01	М	in	М		Ν	lin	Mi		On		RelN	
			ents	NewEvents		States		Transitions		0110		Common	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	2058	0.07	168	0.04	168	0.05	168	0.04	10929	0.1	168	0.05
fzelle	67	62259	0.51	1586	0.24		0.55	71041	0.54	2392	0.21	1544	0.22
rhone_alps	35	1142	0.06	842	0.05	1142	0.06	1142	0.06	1142	0.06	842	0.05
tbed_ctct	84		37.43		18.83		74.24		208.01			2060309	8.1
tbed_nocoll	84		188.52		189.94		109.15		170.97		81.33	893607	4.22
tbed_noderail	84		45.54		287.14		109.03		419.47		201.62		61.47
verriegel4	65	1665	0.17	587	0.13	587	0.13	587	0.13	28906	0.46	587	0.52
profisafe_i4	80	17	0.07	17		44	0.1	21	0.08	94	0.13	17	0.07
profisafe_i4_host	28	12	0.05	12	0.05	39	0.08	12	0.05	89	0.1	12	0.05
profisafe_i4_slave	14	5	0.03	5	0.03	5	0.03	9	0.03	5	0.03	5	0.03
profisafe_i5	88	21	0.09	17	0.08	44	0.12	21	0.1	94	0.14	17	0.09
profisafe_i5_host	28	12 21	$0.06 \\ 0.11$	12 17	0.06	39 44	0.09	12 21	$0.05 \\ 0.11$	89 94	0.11 0.16	12 17	$0.06 \\ 0.1$
profisafe_i6			0.11	11	0.1		0.14		0.11	94 89	0.16	17 12	
	94			19							0.13	12	0.07
profisafe_i6_host	28	12	0.07	12 87	0.07	39 38	0.1	12					0 00
profisafe_inclusion_i4host	$\frac{28}{78}$	12 19	$0.07 \\ 0.07$	87	0.09	38	0.09	33	0.09	554	0.31	29	0.08
profisafe_inclusion_i4host profisafe_inclusion_o4host	28 78 84	12 19 15	$0.07 \\ 0.07 \\ 0.07$	87 87	$0.09 \\ 0.1$	38 38	$0.09 \\ 0.09$	33 33	$0.09 \\ 0.09$	$554 \\ 554$	0.31 0.32	29 29	0.09
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave	28 78 84 84	12 19 15 19	0.07 0.07 0.07 0.08	87 87 87	$0.09 \\ 0.1 \\ 0.1$	38 38 38	0.09 0.09 0.09	33 33 33	$0.09 \\ 0.09 \\ 0.09$	554 554 554	0.31 0.32 0.32	29 29 29	$\begin{array}{c} 0.09 \\ 0.09 \end{array}$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4	28 78 84 84 90	12 19 15 19 17	0.07 0.07 0.07 0.08 0.08	87 87 87 17	$0.09 \\ 0.1 \\ 0.1 \\ 0.08$	38 38 38 44	$0.09 \\ 0.09 \\ 0.09 \\ 0.11$	33 33 33 21	$0.09 \\ 0.09 \\ 0.09 \\ 0.1$	554 554 554 94	0.31 0.32 0.32 0.14	29 29 29 17	$0.09 \\ 0.09 \\ 0.08$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4 profisafe_o4_host	28 78 84 90 30	$12 \\ 19 \\ 15 \\ 19 \\ 17 \\ 12$	0.07 0.07 0.08 0.08 0.08 0.05	87 87 87 17 12	$0.09 \\ 0.1 \\ 0.1 \\ 0.08 \\ 0.05$	38 38 38 44 39	$0.09 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.09$	33 33 33 21 12	$0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.04$	554 554 554 94 89	0.31 0.32 0.32 0.14 0.1	29 29 29 17 12	$0.09 \\ 0.09 \\ 0.08 \\ 0.05$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4 profisafe_o4_host profisafe_o4_slave	28 78 84 90 30 16	$12 \\ 19 \\ 15 \\ 19 \\ 17 \\ 12 \\ 5$	$\begin{array}{c} 0.07 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.04 \end{array}$	87 87 87 17 12 5	$\begin{array}{c} 0.09 \\ 0.1 \\ 0.1 \\ 0.08 \\ 0.05 \\ 0.03 \end{array}$	$38 \\ 38 \\ 38 \\ 44 \\ 39 \\ 5$	$0.09 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.09 \\ 0.03$	33 33 33 21 12 9	$0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.04 \\ 0.04$	554 554 554 94 89 5	$\begin{array}{c} 0.31 \\ 0.32 \\ 0.32 \\ 0.14 \\ 0.1 \\ 0.03 \end{array}$	29 29 29 17 12 5	$0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ 0.04$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4 profisafe_o4_host profisafe_o4_slave profisafe_o5	28 78 84 90 30 16 99	$12 \\ 19 \\ 15 \\ 19 \\ 17 \\ 12 \\ 5 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 $	$\begin{array}{c} 0.07 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \end{array}$	87 87 87 17 12 5 17	$\begin{array}{c} 0.09 \\ 0.1 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.1 \end{array}$	38 38 38 44 39 5 44	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.09 \\ 0.03 \\ 0.14 \end{array}$	33 33 33 21 12 9 21	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.04 \\ 0.04 \\ 0.1 \end{array}$	554 554 554 94 89 5 94	$\begin{array}{c} 0.31 \\ 0.32 \\ 0.32 \\ 0.14 \\ 0.1 \\ 0.03 \\ 0.16 \end{array}$	29 29 29 17 12 5 17	$0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4 profisafe_o4_host profisafe_o4_slave profisafe_o5 profisafe_o5_host	28 78 84 90 30 16 99 30	$12 \\ 19 \\ 15 \\ 19 \\ 17 \\ 12 \\ 5 \\ 17 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12$	$\begin{array}{c} 0.07 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \\ 0.06 \end{array}$	87 87 17 12 5 17 12	$\begin{array}{c} 0.09 \\ 0.1 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.06 \end{array}$	38 38 38 44 39 5 44 39	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.09 \\ 0.03 \\ 0.14 \\ 0.09 \end{array}$	33 33 31 21 12 9 21 12	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.04 \\ 0.04 \\ 0.1 \\ 0.05 \end{array}$	$554 \\ 554 \\ 554 \\ 94 \\ 89 \\ 5 \\ 94 \\ 89 \\ 5 \\ 94 \\ 89 \\ 89$	$\begin{array}{c} 0.31 \\ 0.32 \\ 0.32 \\ 0.14 \\ 0.1 \\ 0.03 \\ 0.16 \\ 0.12 \end{array}$	29 29 29 17 12 5 17 12	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \\ 0.06 \end{array}$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4 profisafe_o4_host profisafe_o4_slave profisafe_o5_profisafe_o5_profisafe_o5_profisafe_o5 profisafe_o6	$28 \\ 78 \\ 84 \\ 90 \\ 30 \\ 16 \\ 99 \\ 30 \\ 106$	$12 \\ 19 \\ 15 \\ 19 \\ 17 \\ 12 \\ 5 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 $	$\begin{array}{c} 0.07 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \end{array}$	87 87 87 17 12 5 17	$\begin{array}{c} 0.09 \\ 0.1 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.06 \\ 0.11 \end{array}$	38 38 38 44 39 5 44 39	$\begin{array}{c} 0.09\\ 0.09\\ 0.09\\ 0.11\\ 0.09\\ 0.03\\ 0.14\\ 0.09\\ 0.16\\ \end{array}$	33 33 33 21 12 9 21	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.04 \\ 0.04 \\ 0.1 \end{array}$	$554 \\ 554 \\ 554 \\ 94 \\ 89 \\ 5 \\ 94 \\ 89 \\ 5 \\ 94 \\ 89 \\ 89$	$\begin{array}{c} 0.31 \\ 0.32 \\ 0.32 \\ 0.14 \\ 0.1 \\ 0.03 \\ 0.16 \\ 0.12 \end{array}$	29 29 29 17 12 5 17	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \\ 0.06 \\ 0.11 \end{array}$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4 profisafe_o4_host profisafe_o4_slave profisafe_o5 profisafe_o5_host	28 78 84 90 30 16 99 30	$12 \\ 19 \\ 15 \\ 19 \\ 17 \\ 12 \\ 5 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 17$	$\begin{array}{c} 0.07\\ 0.07\\ 0.08\\ 0.08\\ 0.05\\ 0.04\\ 0.1\\ 0.06\\ 0.11\\ 0.07\\ \end{array}$	87 87 17 12 5 17 12 17	$\begin{array}{c} 0.09 \\ 0.1 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.06 \\ 0.11 \\ 0.07 \end{array}$	38 38 38 44 39 5 44 39 44	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.09 \\ 0.03 \\ 0.14 \\ 0.09 \end{array}$	33 33 33 21 12 9 21 12 21	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.04 \\ 0.04 \\ 0.1 \\ 0.05 \\ 0.12 \end{array}$	554 554 94 89 5 94 89 94 89	$\begin{array}{c} 0.31 \\ 0.32 \\ 0.32 \\ 0.14 \\ 0.1 \\ 0.03 \\ 0.16 \\ 0.12 \\ 0.18 \\ 0.14 \end{array}$	29 29 29 17 12 5 17 12 17	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \\ 0.06 \end{array}$
profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4 profisafe_o4 profisafe_o4_host profisafe_o5_so profisafe_o5_profisafe_o5 profisafe_o6 profisafe_o6_host	$28 \\ 78 \\ 84 \\ 90 \\ 30 \\ 16 \\ 99 \\ 30 \\ 106 \\ 30$	$12 \\ 19 \\ 15 \\ 19 \\ 17 \\ 12 \\ 5 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 12 \\ 17 \\ 17$	$\begin{array}{c} 0.07 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \\ 0.06 \\ 0.11 \end{array}$	87 87 17 12 5 17 12 17	$\begin{array}{c} 0.09 \\ 0.1 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.1 \\ 0.06 \\ 0.11 \end{array}$	388 388 44 399 5 444 399 444 399	$\begin{array}{c} 0.09\\ 0.09\\ 0.09\\ 0.11\\ 0.09\\ 0.03\\ 0.14\\ 0.09\\ 0.16\\ 0.11 \end{array}$	33 33 33 21 12 9 21 12 21	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.09 \\ 0.1 \\ 0.04 \\ 0.04 \\ 0.1 \\ 0.05 \\ 0.12 \\ 0.07 \end{array}$	554 554 94 89 5 94 89 94 89	$\begin{array}{c} 0.31 \\ 0.32 \\ 0.32 \\ 0.14 \\ 0.1 \\ 0.03 \\ 0.16 \\ 0.12 \\ 0.18 \\ 0.14 \end{array}$	29 29 29 17 12 5 17 12 17 12 17	$\begin{array}{c} 0.09 \\ 0.09 \\ 0.08 \\ 0.05 \\ 0.04 \\ 0.1 \\ 0.06 \\ 0.11 \\ 0.07 \end{array}$

Table 5.3 CULLING CONTROLLABILITY CHECKER NOT PREFERRING PLANTS, LARGEST CONTROLLER FIRST

Model				Culli	ng cheo	cker, preferi	ring pla	,					
		А	.11	Ea		Late		MaxCo				Ma	
				NotA	*	NotAcc	*	Eve			ontr	Stat	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States		States	Time
big_bmw	31	407	0.06	451	0.06	447	0.06	447	0.07	161	0.04	451	0.06
fzelle	67	6190	0.29	18506	0.54	8618	0.41	4976	0.28	5157	0.27	5200	0.27
rhone_alps	35	25320	0.15		3.22	15715	0.12	3210	0.08		0.15	3630	0.08
tbed_ctct	84		107.17	21503	0.17		36.9	21503	0.17	22670	0.23		115.22
tbed_nocoll	84		57.29		287.46		226.58		79.67		61.65		97.81
tbed_noderail	84		71.95		239.34		76.64		82.51		62.44		235.96
verriegel4	65	41175	0.57	21867	0.34	563	0.15	21797	0.34	11411	0.32	44791	0.6
profisafe_i4	80	54	0.11	48	0.11	44	0.1	24	0.08	54	0.11	54	0.11
profisafe_i4_host	28	49	0.09	39	0.08	39	0.08	19	0.05	49	0.09	49	0.09
profisafe_i4_slave	14	5	0.02	9	0.03	5	0.03	5	0.03	5	0.03	5	0.02
profisafe_i5	88	54	0.14	48	0.13	44	0.12	24	0.09	54	0.13	54	0.14
profisafe_i5_host	28	49	0.1	39	0.09	39	0.09	19	0.06	49	0.1	49	0.1
profisafe_i6	94	54	0.16	48	0.15	44	0.14	24	0.1	54	0.15	54	0.15
profisafe_i6_host	28	49	0.11	39	0.11	39	0.1	19	0.07	49	0.11	49	0.12
profisafe_inclusion_i4host	78	406	0.24	145	0.13	28	0.07	33	0.08	266	0.17	407	0.24
profisafe_inclusion_o4host	84	406	0.25	145	0.13	28	0.08	33	0.08	266	0.18	407	0.26
profisafe_inclusion_o4slave	84	406	0.25	145	0.13	28	0.08	33	0.08	266	0.18	407	0.26
profisafe_04	90	54	0.12	48	0.12	44	0.11	24	0.08	54	0.12	54	0.12
profisafe_04_host	30	49	0.09	39	0.08	39	0.08	19	0.05	49	0.09	49	0.09
profisafe_04_slave	16	5	0.03	9	0.04	5	0.03	5	0.03	5	0.03	5	0.03
profisafe_o5	99	54	0.15	48	0.14	44	0.13	24	0.1	54	0.15	54	0.15
profisafe_o5_host	30	49	0.1	39	0.09	39	0.09	19	0.06	49	0.1	49	0.1
profisafe_06	106	54	0.17	48	0.16	44	0.15	24	0.12	54	0.17	54	0.16
profisafe_o6_host	30	49	0.12	39	0.11	39	0.1	19	0.07	49	0.11	49	0.12
ftechnik	36		399.21		166.16		91.74	-	674.43	-	402.85	-	300.83
rhone_tough	61		9.34		10.67		17.82		8.52		9.4		17.13
tbed_uncont	84		57.34		288.05		227.27		79.83		61.85		98.18
Model		Μ	in	М		Min		Μ		0	ne	RelN	
			ents	NewEvents		States		Transitions		0.00		Common	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	161	0.04	161	0.05	161	0.05	161	0.04	407	0.07	161	0.05
fzelle	67	10431	0.38	5096	0.29	12422	0.41	13999	0.41	6190	0.27	6101	0.28
rhone_alps	35	25320	0.15	1108	0.05	429079	1.61	428133	1.58	25320	0.15	1108	0.06
tbed_ctct	84		53.61		40.52		51.94		44.35		107.12	2060309	7.92
tbed_nocoll	84		61.07		62.89		197.72		72.46		57.03		62.54
tbed_noderail	84		28.33		62.9		199.46		179.52		72.19		63.68
verriegel4	65	2471	0.23	751	0.17	751	0.18	751	0.19	41175	0.56	751	0.18
profisafe_i4	80	24	0.08	24	0.08	54	0.11	28	0.09	54	0.11	24	0.08
profisafe_i4_host	28	19	0.06	19	0.06	49	0.09	19	0.06	49	0.09	19	0.06
profisafe_i4_slave	14	5	0.03	5	0.03	5	0.03	9	0.03	5	0.03	5	0.03
profisafe_i5	88	28	0.1	24	0.09	54	0.14	28	0.1	54	0.13	24	0.09
profisafe_i5_host	28	19	0.06	19	0.06	49	0.1	19	0.06	49	0.1	19	0.06
profisafe_i6	94	28	0.12	24	0.11	54	0.15	28	0.12	54	0.15	24	0.1
profisafe_i6_host	28	19	0.07	19	0.07	49	0.12	19	0.07	49	0.11	19	0.07
profisafe_inclusion_i4host	78	26	0.08	94	0.1	48	0.09	43	0.09	406	0.24	36	0.08
profisafe_inclusion_o4host	84	20	0.07	94	0.1	48	0.1	43	0.00	406	0.21	36	0.09
profisafe_inclusion_o4slave	84	26	0.08	94	0.1	48	0.1	43	0.1	406	0.25	36	0.09
profisafe_04	90	20 24	0.08	24	0.08	40 54	0.13	28	0.1	400 54	0.23	24	0.03
profisafe_04_host	30	19	0.05			49	0.13		0.06			19	0.08
profisafe_04_slave	16	15	0.00		0.00	45 5	0.03	19	0.00	45 5		15	0.00
profisafe_05	99	24	0.03	24	0.03	54	0.05	28	0.04	54		24	0.03
profisafe_05_host	30	24 19	0.11		0.1	54 49	0.15	28 19	0.12			24 19	0.1
profisafe_o6	106	19 24	0.00		0.00	49 54	0.17	19 28	0.00			19 24	0.07
profisafe_06_host	30	24 19	0.12	24 19	0.12	54 49	0.17	28 19	0.13	54 49		24 19	$0.12 \\ 0.07$
ftechnik	30	19	0.07	19		49 125961955		19	293.29	49	0.11 399.58	19	168.26
rhone_tough	30 61		327.32 18.49			170301309	25.09		293.29 29.93		399.58 9.39		
tbed_uncont	84		18.49 60.98		$9.76 \\ 62.99$		25.09 197.24		29.93 72.85		9.39 57.39		$9.85 \\ 62.7$
uncom	04		00.98		04.99		131.24		12.00		01.39		04.1

Table 5.4 CULLING CONTROLLABILITY CHECKER PREFERRING PLANTS, SMALLEST CONTROLLER FIRST

Model			(	Culling	checker	, not pr	eferring	g plants	, smalle	est cont	roller fi	irst	
		А	.11	Ea	rly	La	te	MaxCo	mmon	MaxCo	ommon	Ma	x
				NotA	$\operatorname{ccept}$	NotA	$\operatorname{ccept}$	Eve	nts	Unc	ontr	Stat	es
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	407	0.06	451	0.06	447	0.06	333	0.06	161	0.05	8213	0.1
fzelle	67	6190	0.3	17298	0.39	3556	0.3	1949	0.17	2006	0.18	2105	0.18
rhone_alps	35	25320	0.17	615983	3.23	15715	0.11	3308	0.07	6192	0.1	3992	0.07
tbed_ctct	84		107.49	21503	0.17		37.34	21503	0.17	22670	0.23		115.69
tbed_nocoll	84		57.58		408.99		35.58	268037	1.69	283815	2.1		142.88
tbed_noderail	84		72.21		410.83		252.11	272714	1.77	287397	2.17		56.62
verriegel4	65	41175	0.58	22395	0.34	563	0.16	22379	0.36	11411	0.32	39641	0.61
profisafe_i4	80	54	0.12	86	0.12	44	0.1	41	0.08	54	0.12	41	0.08
profisafe_i4_host	28	49	0.09	77	0.09	39	0.08	36	0.05	49	0.09	36	0.06
profisafe_i4_slave	14	5	0.02	9	0.03	5	0.03	5	0.03	5	0.03	5	0.03
profisafe_i5	88	54	0.14	86	0.15	44	0.12	41	0.1	54	0.14	41	0.1
profisafe_i5_host	28	49	0.1	77	0.1	39	0.09	36	0.06	49	0.11	36	0.06
profisafe_i6	94	54	0.16	86	0.16	44	0.14	41	0.11	54	0.16	41	0.11
profisafe_i6_host	28	49	0.2	77	0.11	39	0.1	36	0.07	49	0.11	36	0.07
profisafe_inclusion_i4host	78	406	0.23	104	0.11	28	0.07	62	0.07	266	0.15	118	0.23
profisafe_inclusion_o4host	84	406	0.25	104	0.22	28	0.18	62	0.18	266	0.17	118	0.09
profisafe_inclusion_o4slave	84	406	0.24	104	0.11	28	0.08	62	0.08	266	0.17	118	0.09
profisafe_04	-90	54	0.12	86	0.12	44	0.11	41	0.08	54	0.12	41	0.08
profisafe_o4_host	- 30	49	0.08	77	0.09	39	0.08	36	0.05	49	0.09	36	0.05
profisafe_o4_slave	16	5	0.03	9	0.04	5	0.03	5	0.03	5	0.03	5	0.03
profisafe_o5	- 99	54	0.16	86	0.16	44	0.13	41	0.11	54	0.15	41	0.11
profisafe_o5_host	- 30	49	0.11	77	0.11	39	0.1	36	0.06	49	0.11	36	0.07
profisafe_o6	106	54	0.18	86	0.2	44	0.15	41	0.12	54	0.16	41	0.12
profisafe_o6_host	- 30	49	0.11	77	0.11	39	0.13	36	0.14	49	0.11	36	0.07
ftechnik	- 36		401.65	105403	0.74	128	0.04	128	0.04	128	0.04	11940	0.11
rhone_tough	61		9.52		15.83		25.46		11.61		104		16.05
tbed_uncont	84		57.24		411.73		35.72		96.96		116.68		191.67
	01		57.24			Min		Min		One			
Model	01		in	М						Oı	ne	RelN	
Model		Eve	ents	NewE	vents	Sta	tes	Trans	itions			Com	mon
Model Name	Aut	Eve States	ents Time	NewE States	vents Time	Sta States	tes Time	Trans States	itions Time	States	Time	Comr States	mon Time
Model Name big_bmw	Aut 31	Eve States 161	ents Time 0.05	NewE States 161	vents Time 0.04	Sta States 161	tes Time 0.05	Trans States 161	itions Time 0.04	States 407	Time 0.06	Comr States 161	mon Time 0.05
Model Name big_bmw fzelle	Aut 31 67	Eve States 161 10431	Time 0.05 0.4	NewE States 161 1960	vents Time 0.04 0.19	States 161 21266	tes Time 0.05 0.48	Trans States 161 22843	itions Time 0.04 0.47	States 407 6190	Time 0.06 0.28	Comr States 161 1991	mon Time 0.05 0.17
Model Name big_bmw fzelle rhone_alps	Aut 31 67 35	Eve States 161	Time 0.05 0.4 0.16	NewE States 161	Time 0.04 0.19 0.05	Sta States 161	tes <u>Time</u> 0.05 0.48 1.61	Trans States 161	tiions Time 0.04 0.47 1.59	States 407	Time 0.06 0.28 0.15	Comr States 161 1991 1108	mon Time 0.05 0.17 0.05
Model Name big.bmw fzelle rhone_alps tbed_ctct	Aut 31 67 35 84	Eve States 161 10431	Time 0.05 0.4 0.16 53.78	NewE States 161 1960	Time 0.04 0.19 0.05 40.55	States 161 21266	tes <u>Time</u> 0.05 0.48 1.61 51.99	Trans States 161 22843	titions Time 0.04 0.47 1.59 44.48	States 407 6190	Time 0.06 0.28 0.15 107.68	Comr States 161 1991 1108 2060309	mon Time 0.05 0.17 0.05 7.95
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll	Aut 31 67 35 84 84	Eve States 161 10431	Time 0.05 0.4 0.16 53.78 127	NewE States 161 1960	vents Time 0.04 0.19 0.05 40.55 109.12	States 161 21266	tes <u>Time</u> 0.05 0.48 1.61 51.99 182.56	Trans States 161 22843	$\begin{array}{r} \text{itions} \\ \hline \text{Time} \\ 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \end{array}$	States 407 6190	Time 0.06 0.28 0.15 107.68 57.13	Comr States 161 1991 1108 2060309 471700	mon Time 0.05 0.17 0.05 7.95 2.63
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail	Aut 31 67 35 84 84 84	Eve States 161 10431 25320	Time 0.05 0.4 0.16 53.78 127 29.28	NewE States 161 1960 1108	vents Time 0.04 0.19 0.05 40.55 109.12 159.07	States 161 21266 429079	tes Time 0.05 0.48 1.61 51.99 182.56 181.45	Trans States 161 22843 428133	itions Time 0.04 0.47 1.59 44.48 126.99 25.2	States 407 6190 25320	Time 0.06 0.28 0.15 107.68 57.13 71.98	Comi States 161 1991 1108 2060309 471700 405748	mon Time 0.05 0.17 0.05 7.95 2.63 2.3
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4	Aut 31 67 35 84 84 84 65	Eve States 161 10431 25320 2471	ents Time 0.05 0.4 0.16 53.78 127 29.28 0.23	NewE States 161 1960 1108 751	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18	States 161 21266 429079 751	tes Time 0.05 0.48 1.61 51.99 182.56 181.45 0.18	Trans States 161 22843 428133 751	$\begin{array}{r} \begin{array}{c} \mbox{itions} \\ \hline \mbox{Time} \\ \hline 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \end{array}$	States 407 6190 25320 41175	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56	Comi States 161 1991 1108 2060309 471700 405748 751	mon Time 0.05 0.17 0.05 7.95 2.63 2.3 0.18
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4	Aut 31 67 35 84 84 84 65 80	Eve States 161 10431 25320 2471 24	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08	NewE States 161 1960 1108 751 24	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08	States 161 21266 429079 751 54	$\begin{array}{c} \text{tes} \\ \hline \text{Time} \\ 0.05 \\ 0.48 \\ 1.61 \\ 51.99 \\ 182.56 \\ 181.45 \\ 0.18 \\ 0.12 \end{array}$	Trans States 161 22843 428133 751 28	$\begin{array}{r} \label{eq:states} \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \end{array}$	States 407 6190 25320 41175 54	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56 0.11	Comi States 161 1991 1108 2060309 471700 405748 751 24	mon Time 0.05 0.17 0.05 7.95 2.63 2.3 0.18 0.08
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host	Aut 31 67 35 84 84 84 65 80 28	Eve States 161 10431 25320 2471 24 19	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06	NewE States 161 1960 1108 751 24 19	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.06	States 161 21266 429079 751 54 49	Time 0.05 0.48 1.61 51.99 182.56 181.45 0.18 0.12 0.1	Trans States 161 22843 428133 751 28 19	titions <u>Time</u> 0.04 0.47 1.59 44.48 126.99 25.2 0.18 0.09 0.06	States 407 6190 25320 41175 54 49	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56 0.11 0.09	Com States 161 1991 1108 2060309 471700 405748 751 24 19	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.05 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave	Aut 31 67 35 84 84 84 65 80 28 14	Eve States 161 10431 25320 2471 24 19 5	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06           0.02	NewE States 161 1960 1108 751 24 19 5	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.06           0.03	$\begin{array}{r} {\rm States} \\ \hline 161 \\ 21266 \\ 429079 \\ 751 \\ 54 \\ 49 \\ 5 \end{array}$	Time 0.05 0.48 1.61 51.99 182.56 181.45 0.18 0.12 0.1 0.03	Trans States 161 22843 428133 751 28 19 9	$\begin{array}{c} \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \end{array}$	States 407 6190 25320 41175 54 49 5	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56 0.11 0.09 0.03	Com States 161 1991 1108 2060309 471700 405748 751 24 19 5	mon Time 0.05 0.17 0.05 7.95 2.63 2.3 0.18 0.08 0.05 0.03
Model Name big.bmw fzelle rhone.alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5	Aut 31 67 35 84 84 84 65 80 28 14 88	Eve States 161 10431 25320 2471 24 19 5 28	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06           0.02           0.1	NewE States 161 1960 1108 751 24 19 5 24	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.06           0.03           0.09	States 161 21266 429079 751 54 49 5 54	tes Time 0.05 0.48 1.61 51.99 182.56 181.45 0.18 0.12 0.1 0.03 0.14	Trans States 161 22843 428133 751 28 19 9 28	$\begin{array}{c} \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.1 \end{array}$	States 407 6190 25320 41175 54 49 5 54	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56 0.11 0.09 0.03 0.13	Comi States 161 1991 1108 2060309 471700 405748 751 24 19 5 24	mon           Time           0.05           0.17           0.05           2.63           2.3           0.18           0.08           0.05           0.03           0.09
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4_host profisafe_i5 profisafe_i5_host	Aut 31 67 35 84 84 84 65 80 28 14 88 28	Eve States 161 10431 25320 2471 24 19 5 28 19	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06           0.02           0.11           0.07	NewE States 161 1960 1108 751 24 19 5 24 19	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.06           0.03           0.09           0.06	States           161           21266           429079           751           54           49           5           54           49	tes Time 0.05 0.48 1.61 51.99 182.56 181.45 0.18 0.12 0.1 0.03 0.14 0.1	Trans States 161 22843 428133 751 28 19 9 28 19	Time           0.04           0.47           1.59           44.48           126.99           25.2           0.18           0.09           0.06           0.03           0.1           0.07	States           407           6190           25320           41175           54           49           54           49	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56 0.11 0.09 0.03 0.13 0.1	Comi States 161 1991 1108 2060309 471700 405748 751 24 19 5 24 19	mon           Time           0.05           0.17           0.05           2.63           2.3           0.18           0.08           0.05           0.03           0.09           0.07
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_sost profisafe_i5_host profisafe_i6	Aut 31 67 35 84 84 84 65 80 28 14 88 28 14 88 28 94	Eve States 161 10431 25320 2471 24 19 5 28 19 28	ents Time 0.05 0.4 0.16 53.78 127 29.28 0.23 0.08 0.08 0.02 0.11 0.07 0.12	NewE States 161 1960 1108 751 24 19 5 24 19 24	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.03           0.09           0.06           0.11	States           161           21266           429079           751           54           49           5           54           49           54           49           54           49           54	tes <u>Time</u> 0.05 0.48 1.61 51.99 182.56 181.45 0.18 0.12 0.11 0.03 0.14 0.1 0.16	Trans States 161 22843 428133 751 28 19 9 9 28 19 28	Time           0.04           0.47           1.59           44.48           126.99           25.2           0.18           0.09           0.06           0.03           0.1           0.07           0.12	States           407           6190           25320           41175           54           49           54           49           54	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56 0.11 0.09 0.03 0.13 0.1 0.2	Comm States 161 1991 1108 2060309 471700 405748 751 24 19 5 244 19 24	mon           Time           0.05           0.17           0.05           7.95           2.63           2.3           0.18           0.08           0.03           0.09           0.07           0.1
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_alave profisafe_i5_host profisafe_i6 profisafe_i6_host	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 28 19	ents Time 0.05 0.4 0.16 53.78 127 29.28 0.23 0.08 0.06 0.02 0.11 0.07 0.12 0.07	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 24	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.03           0.09           0.06           0.11           0.07	States 161 21266 429079 751 54 49 5 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 54 54 54 54 54 54 54 54 54	tes <u>Time</u> 0.05 0.48 1.61 51.99 182.56 181.45 0.18 0.12 0.1 0.03 0.14 0.14 0.16 0.11	Trans States 161 22843 428133 751 28 19 9 28 19 28 19 28 19	itions           Time           0.04           0.47           1.59           44.48           126.99           25.2           0.18           0.09           0.03           0.11           0.07           0.12	States           407           6190           25320           41175           54           49           5           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54	Time 0.06 0.28 0.15 107.68 57.13 71.98 0.56 0.11 0.09 0.03 0.13 0.1 0.2 0.11	Comm States 161 1991 1108 2060309 471700 405748 751 24 199 5 24 199 24 199	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4 profisafe_i4_slave profisafe_i5_host profisafe_i6 profisafe_i6 profisafe_i6_host profisafe_i6_host profisafe_i6_host	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 28 19 28	Time           0.05           0.4           0.16           53.78           1277           29.28           0.23           0.06           0.02           0.11           0.07           0.07	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 24 19 94	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.06           0.03           0.09           0.06           0.11	States 161 21266 429079 751 54 49 5 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 49 54 54 54 54 54 54 54 54 54 54	Time           0.05           0.48           1.61           51.99           182.566           181.45           0.18           0.12           0.13           0.14           0.11           0.09	Trans States 161 22843 428133 751 28 19 9 28 19 28 19 28 19 28 19 28	$\begin{array}{c} \mbox{itions} \\ \hline \mbox{Time} \\ \hline \mbox{0.04} \\ 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.09 \\ 0.09 \\ 0.09 \end{array}$	States           407           6190           25320           41175           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           54           54           61           62           64           64           54           54           54           55           56           57	Time           0.06           0.28           0.15           107.68           57.13           71.98           0.56           0.11           0.09           0.03           0.13           0.1           0.2           0.11	Comn States 161 1991 1108 2060309 471700 405748 751 24 19 5 24 19 24 19 24 19 36	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 28 19 28 19 26 22	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.06           0.02           0.11           0.07           0.07           0.07           0.07           0.07	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 24 94 94	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.06           0.03           0.09           0.06           0.11	States           161           21266           429079           751           54           49           54           49           54           49           54           49           48           48	tes Time 0.05 0.48 1.61 51.99 182.56 181.45 0.18 0.12 0.1 0.03 0.14 0.16 0.11 0.09 0.13	Trans States 161 22843 428133 751 28 19 9 28 19 28 19 28 19 43 43	itions           Time           0.04           0.47           1.59           44.48           126.99           25.2           0.18           0.09           0.06           0.03           0.1           0.07           0.12           0.09           0.09	$\begin{array}{c} {\rm States} \\ 407 \\ 6190 \\ 25320 \\ \\ 41175 \\ 54 \\ 49 \\ 55 \\ 54 \\ 49 \\ 54 \\ 49 \\ 406 \\ 406 \\ \end{array}$	Time           0.06           0.28           0.15           107.68           57.13           71.98           0.56           0.11           0.09           0.03           0.13           0.1           0.2           0.11           0.22	$\begin{array}{r} \hline \text{Comm}\\ \hline \text{States} \\ \hline 161 \\ 1991 \\ 1108 \\ 2060309 \\ 471700 \\ 405748 \\ 751 \\ 24 \\ 199 \\ 5 \\ 24 \\ 19 \\ 24 \\ 199 \\ 24 \\ 199 \\ 366 \\ 36 \end{array}$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_inclusion_o4slave	Aut 31 67 35 84 84 85 80 28 14 88 28 94 28 78 84 84 84 84	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 28 19 28 29 28 29 20	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.002           0.11           0.07           0.07           0.07           0.07           0.07           0.07	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 94 94 94	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.06           0.03           0.09           0.06           0.11           0.11           0.11	States           161           21266           429079           751           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           48           48           48	$\begin{array}{c} \text{ttes} \\ \hline \textbf{Time} \\ 0.05 \\ 0.48 \\ 1.61 \\ 51.99 \\ 182.56 \\ 181.45 \\ 0.18 \\ 0.12 \\ 0.1 \\ 0.13 \\ 0.14 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.13 \\ 0.1 \end{array}$	Trans States 161 22843 428133 751 28 19 9 28 19 28 19 28 19 28 19 43 43 43	$\begin{array}{c} \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.1 \\ 0.07 \\ 0.12 \\ 0.09 \\ 0.09 \\ 0.01 \\ 0.1 \\ 0.1 \end{array}$	$\begin{array}{c} {\rm States} \\ 407 \\ 6190 \\ 25320 \\ \\ 41175 \\ 54 \\ 499 \\ 55 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 406 \\ 406 \\ 406 \\ \end{array}$	$\begin{array}{c} \hline {\rm Time} \\ 0.06 \\ 0.28 \\ 0.15 \\ 107.68 \\ 57.13 \\ 71.98 \\ 0.56 \\ 0.11 \\ 0.03 \\ 0.13 \\ 0.1 \\ 0.2 \\ 0.11 \\ 0.22 \\ 0.22 \\ 0.22 \end{array}$	$\begin{array}{c} \text{Comm}\\ \text{States} \\ 161 \\ 1991 \\ 1108 \\ 2060309 \\ 471700 \\ 405748 \\ 751 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 24 \\ 19 \\ 24 \\ 19 \\ 366 \\ 36 \\ 36 \\ 36 \end{array}$	mon           Time           0.05           0.17           0.05           7.95           2.63           2.3           0.18           0.08           0.03           0.09           0.07           0.1           0.09           0.07           0.1           0.08           0.08           0.08           0.08           0.08
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_bost profisafe_i4_slave profisafe_i5 profisafe_i5_bost profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4bost profisafe_inclusion_o4slave profisafe_o4	Aut 31 67 35 84 84 85 80 28 14 88 28 94 28 78 84 84 84 90	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 28 19 26 22 26 24	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06           0.02           0.11           0.07           0.12           0.07           0.07           0.07           0.08           0.08           0.08           0.08	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 24 19 94 94 94	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.06           0.03           0.09           0.06           0.11           0.07           0.11           0.011	States           161           21266           429079           751           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54	$\begin{array}{c} \text{ttes} \\ \hline \textbf{Time} \\ 0.05 \\ 0.48 \\ 1.61 \\ 51.99 \\ 182.56 \\ 181.45 \\ 0.18 \\ 0.12 \\ 0.1 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.16 \\ 0.11 \\ 0.09 \\ 0.13 \\ 0.11 \\ 0.12 \end{array}$	Trans States 161 22843 428133 751 28 19 9 9 28 19 28 19 28 19 28 19 43 43 43 43 28	$\begin{array}{c} \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.09 \\ 0.09 \\ 0.01 \\ 0.11 \\ 0.16 \\ 0.16 \\ 0.01 \\ 0.16 \\ 0.01 \\ 0.16 \\ 0.01 \\ 0.16 \\ 0.01$	$\frac{\text{States}}{407}$ $4107$ $25320$ $41175$ $54$ $499$ $54$ $499$ $544$ $499$ $4066$ $4066$ $4066$ $544$	$\begin{array}{c} \hline {\rm Time} \\ 0.06 \\ 0.28 \\ 0.15 \\ 107.68 \\ 57.13 \\ 71.98 \\ 0.56 \\ 0.11 \\ 0.09 \\ 0.03 \\ 0.13 \\ 0.11 \\ 0.22 \\ 0.11 \\ 0.22 \\ 0.22 \\ 0.11 \end{array}$	Comm States 161 1991 1108 2060309 471700 405748 751 24 19 5 5 24 19 24 19 24 19 36 366 366 36 24	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_sost profisafe_i5_profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_profisafe_o4_host	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84 84 90 30	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 28 19 26 22 26 6 24 19	Time           0.05           0.4           0.16           53.78           0.23           0.08           0.06           0.02           0.11           0.07           0.07           0.07           0.08           0.08	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 94 94 94 94	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.06           0.11           0.07           0.11           0.07           0.11           0.08           0.07	States           161           21266           429079           751           54           49           5           44           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           48           48           54           54           49           54           54           49	$\begin{array}{c} \text{tes} \\ \hline \textbf{Time} \\ \hline 0.05 \\ 0.48 \\ 1.61 \\ 51.99 \\ 182.56 \\ 181.45 \\ 0.12 \\ 0.11 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.06 \\ 0.11 \\ 0.09 \\ 0.13 \\ 0.12 \\ 0.13 \\ 0.12 \\ 0.13 \end{array}$	Trans States 161 22843 428133 751 28 19 28 19 28 19 28 19 43 43 43 43 43 43 19	$\begin{array}{c} \mbox{itions} \\ \hline \mbox{Time} \\ \hline \mbox{0.04} \\ 0.04 \\ 0.47 \\ 1.59 \\ 4.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.09 \\ 0.09 \\ 0.01 \\ 0.11 \\ 0.16 \\ 0.05 \end{array}$	$\begin{array}{r} {\rm States} \\ 407 \\ 6190 \\ 25320 \\ 41175 \\ 54 \\ 49 \\ 554 \\ 49 \\ 54 \\ 49 \\ 54 \\ 49 \\ 406 \\ 406 \\ 406 \\ 406 \\ 54 \\ 49 \\ \end{array}$	Time           0.06           0.28           0.15           107.68           57.13           71.98           0.56           0.11           0.09           0.03           0.13           0.11           0.22           0.11           0.22           0.21           0.22           0.21           0.22	Comm States 161 1991 1108 2060309 471700 405748 751 24 19 5 24 419 5 24 19 24 19 366 366 366 364 24	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.05 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_noccll tbed_noderail verriegel4 profisafe_i4 profisafe_i5 profisafe_i5_host profisafe_i6 profisafe_i6 profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4 profisafe_o4_slave	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 94 82 8 84 84 84 90 30 16	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 26 22 26 24 24 19 5 5	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06           0.02           0.11           0.07           0.07           0.07           0.08           0.05           0.03	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 94 94 94 24 19 5	$\begin{array}{c} \hline {\rm Time} \\ \hline {\rm Time} \\ \hline 0.04 \\ 0.19 \\ 0.05 \\ 40.55 \\ 109.12 \\ 159.07 \\ 0.18 \\ 0.08 \\ 0.06 \\ 0.03 \\ 0.09 \\ 0.06 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.11 \\ 0.07 \\ 0.1 \\ 0.05 \\ 0.04 \\ \end{array}$	States           161           21266           429079           751           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           54           54           54           55           54           55           54           55           54           55           54           55           54           55           54           55           54           55           54           55           54           55           54           55           56           57           58           59	tes Time 0.05 0.48 1.61 51.99 182.566 181.45 0.18 0.12 0.1 0.03 0.14 0.11 0.06 0.11 0.09 0.13 0.12 0.13 0.13 0.12 0.13 0.14 0.15 0.14 0.15 0.14 0.15 0.14 0.15 0.14 0.15 0.15 0.18 0.12 0.15 0.14 0.12 0.15 0.14 0.12 0.15 0.14 0.12 0.14 0.12 0.14 0.12 0.14 0.12 0.14 0.12 0.14 0.12 0.14 0.12 0.13 0.14 0.12 0.13 0.14 0.13 0.13 0.14 0.13 0.13 0.14 0.13 0.14 0.15 0.13 0.14 0.13 0.13 0.14 0.13 0.14 0.13 0.14 0.13 0.13 0.14 0.13 0.13 0.14 0.13 0.14 0.13 0.14 0.15 0.14 0.15 0.13 0.14 0.15 0.13 0.14 0.13 0.14 0.15 0.	Trans States 161 22843 428133 751 28 19 9 28 19 28 19 28 19 43 43 43 28 19 9 28	$\begin{array}{c} \mbox{itions} \\ \hline \mbox{Time} \\ \hline \mbox{0.04} \\ 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.16 \\ 0.05 \\ 0.04 \end{array}$	$\begin{array}{r} {\rm States} \\ 407 \\ 6190 \\ 25320 \\ 41175 \\ 54 \\ 49 \\ 55 \\ 54 \\ 49 \\ 54 \\ 49 \\ 54 \\ 406 \\ 406 \\ 406 \\ 54 \\ 49 \\ 55 \\ \end{array}$	$\begin{array}{c} \text{Time} \\ \hline 0.06 \\ 0.28 \\ 0.15 \\ 107.68 \\ 57.13 \\ 71.98 \\ 0.56 \\ 0.11 \\ 0.09 \\ 0.03 \\ 0.13 \\ 0.11 \\ 0.22 \\ 0.11 \\ 0.22 \\ 0.22 \\ 0.22 \\ 0.11 \\ 0.28 \\ 0.03 \\ \end{array}$	$\begin{array}{c} \text{Comm}\\ \hline \text{States} \\ 161 \\ 1991 \\ 1108 \\ 2060309 \\ 471700 \\ 405748 \\ 751 \\ 24 \\ 199 \\ 5 \\ 24 \\ 199 \\ 24 \\ 199 \\ 366 \\ 366 \\ 366 \\ 24 \\ 199 \\ 5 \\ \end{array}$	$\begin{array}{c} \text{mon} \\ \hline \text{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.03 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.03 \\ \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_host profisafe_o5	Aut 31 67 35 84 84 84 88 28 94 28 78 84 84 88 84 84 90 30 16 99	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 26 22 26 24 19 26 22 26 24 19 5 24	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06           0.02           0.11           0.07           0.07           0.07           0.08           0.08           0.03           0.11	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 94 94 94 94 94 24 19 5 24	$\begin{tabular}{ c c c c } \hline \hline Time & \\ \hline \hline Time & \\ \hline \hline 0.04 & \\ 0.05 & \\ 0.05 & \\ 109.12 & \\ 159.07 & \\ 0.18 & \\ 0.06 & \\ 0.03 & \\ 0.09 & \\ 0.06 & \\ 0.03 & \\ 0.09 & \\ 0.06 & \\ 0.11 & \\ 0.01 & \\ 0.11 & \\ 0.11 & \\ 0.11 & \\ 0.08 & \\ 0.05 & \\ 0.04 & \\ 0.12 & \\ \hline \end{tabular}$	$\begin{array}{r} {\rm Sta}\\ {\rm States}\\ 161\\ 21266\\ 429079\\ 751\\ 54\\ 49\\ 5\\ 54\\ 49\\ 55\\ 54\\ 49\\ 54\\ 48\\ 48\\ 48\\ 48\\ 48\\ 54\\ 48\\ 54\\ 48\\ 55\\ 54\\ \end{array}$	$\begin{array}{c} \text{ttes} \\ \hline \textbf{Time} \\ \hline 0.05 \\ 0.48 \\ 1.61 \\ 51.99 \\ 182.56 \\ 181.45 \\ 0.18 \\ 0.12 \\ 0.11 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.03 \\ 0.15 \\ \end{array}$	Trans           States           161           22843           428133           7511           28           19           28           19           43           43           99           28           19           28           19           28           19           28           28           19           28           28           28           19           28           28           28           28           28           28           28           28           28           28           28           29           28           19           9           28           29           28           29           28           29           28           19           28           19           28	$\begin{array}{c} \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.04 \\ 0.47 \\ 1.59 \\ 4.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.06 \\ 0.03 \\ 0.1 \\ 0.07 \\ 0.12 \\ 0.09 \\ 0.09 \\ 0.11 \\ 0.16 \\ 0.05 \\ 0.04 \\ 0.12 \end{array}$	$\begin{array}{r} {\rm States} \\ 407 \\ 6190 \\ 25320 \\ \\ 41175 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 406 \\ 406 \\ 406 \\ 406 \\ 54 \\ 49 \\ 5 \\ 54 \end{array}$	$\begin{array}{c} \hline {\rm Time} \\ 0.06 \\ 0.28 \\ 0.15 \\ 107.68 \\ 57.13 \\ 71.98 \\ 0.56 \\ 0.11 \\ 0.03 \\ 0.13 \\ 0.1 \\ 0.22 \\ 0.11 \\ 0.22 \\ 0.21 \\ 0.22 \\ 0.11 \\ 0.03 \\ 0.15 \\ \end{array}$	$\begin{array}{r} \hline \text{Comm}\\ \hline \text{States} \\ \hline 161 \\ 1991 \\ 1108 \\ 2060309 \\ 471700 \\ 405748 \\ 751 \\ 24 \\ 199 \\ 5 \\ 24 \\ 199 \\ 24 \\ 199 \\ 366 \\ 36 \\ 36 \\ 36 \\ 36 \\ 24 \\ 199 \\ 5 \\ 24 \end{array}$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.05 \\ 0.03 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.03 \\ 0.011 \\ \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5_profisafe_o5_host	Aut 31 67 35 84 84 84 88 84 88 84 88 84 88 84 84 90 300 16 99 30	Eve States 161 10431 25320 2471 24 199 5 288 199 266 222 266 244 199 5 244 19	Time           0.05           0.4           0.16           53.78           127           29.28           0.23           0.08           0.06           0.02           0.11           0.07           0.08           0.08           0.07           0.07           0.07           0.08           0.08           0.03           0.04           0.05           0.03           0.11           0.07	$\begin{array}{r} \hline \text{NewE}\\ \hline \\ \hline$	$\begin{tabular}{ c c c c } \hline \hline Time & \\ \hline \hline Time & \\ \hline \hline 0.04 & \\ 0.04 & \\ 0.04 & \\ 0.05 & \\ 40.55 & \\ 109.12 & \\ 159.07 & \\ 0.18 & \\ 0.08 & \\ 0.08 & \\ 0.03 & \\ 0.09 & \\ 0.06 & \\ 0.11 & \\ 0.07 & \\ 0.11 & \\ 0.11 & \\ 0.11 & \\ 0.11 & \\ 0.07 & \\ 0.11 & \\ 0.12 & \\ 0.07 & \\ 0.01 & \\ 0.$	States           161           21266           429079           751           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49           54           49	$\begin{array}{c} \text{ttes} \\ \hline \textbf{Time} \\ \hline 0.05 \\ 0.48 \\ 1.61 \\ 51.99 \\ 182.56 \\ 181.45 \\ 0.18 \\ 0.12 \\ 0.11 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.13 \\ 0.13 \\ 0.15 \\ 0.24 \end{array}$	Trans States 161 22843 428133 751 28 19 9 28 19 28 19 433 433 433 43 28 19 9 28 19 9 28 19 9 28 19 9 28 19 9 28 19 9 28 19 9 28 19 9 28 19 9 28 19 9 28 19 19 28 19 19 28 19 19 28 19 19 28 19 19 28 19 19 28 19 19 28 19 19 19 19 19 19 19 19 19 19	$\begin{array}{c} \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.09 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.09 \\ 0.09 \\ 0.01 \\ 0.11 \\ 0.16 \\ 0.05 \\ 0.04 \\ 0.12 \\ 0.06 \end{array}$	$\begin{array}{c} {\rm States} \\ 407 \\ 6190 \\ 25320 \\ \\ 41175 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 406 \\ 406 \\ 54 \\ 49 \\ 55 \\ 54 \\ 49 \\ 55 \\ 49 \\ \end{array}$	$\begin{array}{c} \hline {\rm Time} \\ 0.06 \\ 0.28 \\ 0.15 \\ 107.68 \\ 57.13 \\ 71.98 \\ 0.56 \\ 0.11 \\ 0.03 \\ 0.13 \\ 0.13 \\ 0.11 \\ 0.22 \\ 0.11 \\ 0.22 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.56 \\ 0.08 \\ 0.03 \\ 0.15 \\ 0.09 \end{array}$	$\begin{array}{r} \hline \text{Comm}\\ \hline \text{States} \\ \hline 161 \\ 1991 \\ 1108 \\ 2060309 \\ 471700 \\ 405748 \\ 751 \\ 24 \\ 199 \\ 5 \\ 24 \\ 199 \\ 24 \\ 199 \\ 366 \\ 366 \\ 36 \\ 36 \\ 36 \\ 24 \\ 19 \\ 5 \\ 24 \\ 19 \\ 19 \\ 36 \\ 36 \\ 36 \\ 36 \\ 36 \\ 36 \\ 36 \\ 3$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.08 \\ 0.03 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.01 \\ 0.07 \\ \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocent tbed_noderail verriegel4 profisafe_i4_bost profisafe_i5_bost profisafe_i5_bost profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_bost profisafe_o5_bost profisafe_o5_host profisafe_o6_bost	Aut 31 67 35 84 84 84 88 28 14 88 28 94 28 88 48 88 48 84 88 84 80 0 106	Eve States 161 10431 25320 2471 24 19 5 28 19 28 19 28 19 28 29 26 22 26 24 19 5 5 24 19 26 22 26 24 19 26 22 26 24 24 19 26 22 26 24 24 24 24 24 26 26 26 26 26 26 26 26 26 26 26 26 26	$\begin{array}{c} \\ \hline {\rm Time} \\ \hline 0.05 \\ 0.4 \\ 0.16 \\ 53.78 \\ 127 \\ 29.28 \\ 0.23 \\ 0.08 \\ 0.06 \\ 0.02 \\ 0.11 \\ 0.07 \\ 0.12 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.05 \\ 0.03 \\ 0.11 \\ 0.07 \\ 0.16 \\ \end{array}$	NewE States 161 1960 1108 751 24 19 5 24 19 24 19 94 94 24 19 5 24 19 94 94 24	Time           0.04           0.19           0.05           40.55           109.12           159.07           0.18           0.08           0.03           0.09           0.06           0.11           0.07           0.11           0.011           0.05           0.04           0.05           0.04           0.05           0.04           0.07           0.12	$\begin{array}{r} {\rm Sta}\\ {\rm States}\\ 161\\ 21266\\ 429079\\ 751\\ 54\\ 499\\ 5\\ 54\\ 49\\ 54\\ 49\\ 54\\ 49\\ 54\\ 48\\ 48\\ 48\\ 48\\ 54\\ 49\\ 5\\ 54\\ 49\\ 5\\ 54\\ 49\\ 5\\ 54\\ 54\\ 54\\ 54\\ 55\\ 54\\ 55\\ 54\\ 55\\ 54\\ 55\\ 55$	$\begin{array}{c} \text{ttes} \\ \hline \textbf{Time} \\ 0.05 \\ 0.48 \\ 1.61 \\ 51.99 \\ 182.56 \\ 181.45 \\ 0.12 \\ 0.13 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.14 \\ 0.11 \\ 0.12 \\ 0.13 \\ 0.13 \\ 0.12 \\ 0.13 \\ 0.14 \\ 0.14 \\ 0.14 \\ 0.14 \\ 0.11 \\ 0.03 \\ 0.15 \\ 0.24 \\ 0.17 \\ \end{array}$	Trans States 161 22843 428133 428133 751 288 19 9 288 19 288 19 288 19 9 288 19 9 288 19 9 288 19 9 288 19 9 288 19 9 288 19 9 288 19 288 19 9 288 19 288 19 9 288 19 288 19 288 19 9 288 19 288 288 19 288 288 19 288 19 288 19 288 288 19 288 288 19 288 19 288 288 19 288 288 288 288 288 288 288 28	$\begin{array}{c} \hline \text{itions} \\ \hline \hline \text{Time} \\ \hline 0.04 \\ 0.47 \\ 1.59 \\ 44.48 \\ 126.99 \\ 25.2 \\ 0.18 \\ 0.09 \\ 0.03 \\ 0.11 \\ 0.03 \\ 0.12 \\ 0.09 \\ 0.03 \\ 0.11 \\ 0.16 \\ 0.05 \\ 0.04 \\ 0.12 \\ 0.06 \\ 0.26 \end{array}$	$\begin{array}{c} {\rm States} \\ 407 \\ 6190 \\ 25320 \\ \\ 41175 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 54 \\ 499 \\ 54 \\ 406 \\ 406 \\ 406 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 499 \\ 55 \\ 54 \\ 55 \\ 55$	$\begin{array}{c} \hline {\rm Time} \\ 0.06 \\ 0.28 \\ 0.15 \\ 107.68 \\ 57.13 \\ 71.98 \\ 0.56 \\ 0.11 \\ 0.03 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.12 \\ 0.22 \\ 0.22 \\ 0.22 \\ 0.22 \\ 0.11 \\ 0.22 \\ 0.22 \\ 0.11 \\ 0.08 \\ 0.03 \\ 0.15 \\ 0.09 \\ 0.15 \end{array}$	$\begin{array}{c} \text{Comm}\\ \hline \text{States} \\ 161 \\ 1991 \\ 1108 \\ 2060309 \\ 471700 \\ 405748 \\ 751 \\ 24 \\ 199 \\ 5 \\ 24 \\ 199 \\ 24 \\ 199 \\ 366 \\ 366 \\ 366 \\ 24 \\ 199 \\ 5 \\ 24 \\ 199 \\ 24 \\ 199 \\ 24 \end{array}$	$\begin{array}{c} \text{mon} \\ \hline \textbf{Time} \\ 0.05 \\ 0.17 \\ 0.05 \\ 7.95 \\ 2.63 \\ 2.3 \\ 0.18 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.07 \\ 0.1 \\ 0.09 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.08 \\ 0.015 \\ 0.03 \\ 0.112 \\ 0.07 \\ 0.12 \\ 0.07 \\ 0.12 \\ 0.07 \\ 0.12 \\ 0.015 \\ 0.01$
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Table 5.5 CULLING CONTROLLABILITY CHECKER NOT PREFERRING PLANTS, SMALLEST CONTROLLER FIRST

# Chapter 6 Projecting Checker

One of the limitations of the modular technique of controllability checking is that regardless of how well automata are chosen for the composition, it may be the case that the smallest subset of states which can be used to prove the model controllable may still have a synchronous product which is too large to handle.

In this chapter we outlined a method of automatically abstracting a model using projection [?, 9] into a much smaller model, which is controllable if and only if the original model is controllable and how we can use this method in a controllability checker to make more models solvable.

This chapter is broken up into several sections. Section 1 discusses the transformation which we designed to convert a model into a form which we can use projection on it. Section 2 discusses what exactly projection is and and how we can use it to simplify the automata in the model. Section 3 details two algorithms for iteratively using projection to simplify a model and how to choose which set of automata to project at each step. Section 4 details algorithm that was designed for converting a counterexample from a projected model into an equivalent counterexample for the original model. Section 5 discusses two controllability checker which were designed to use projection to help check controllability. Section 6 discusses areas where caching was used to improve performance. Finally Section 7 discusses the results achieved by the various algorithms.

### 6.1 Automata Transformation

To be able to use projection effectively, it is necessary to convert the standard controllability problem of asking whether uncontrollable events can happen at an inopportune time into the much simpler problem of simply whether or not certain bad events can happen. To do this, we transform the plant P and the controller C in the original model into a plant P' and a controller C' by adding new  $\gamma$  events into the model such that if we enumerate all the controllers in the model  $C_i$  and uncontrollable events  $v_j$ , then the event  $\gamma_{i,j}$  can occur only

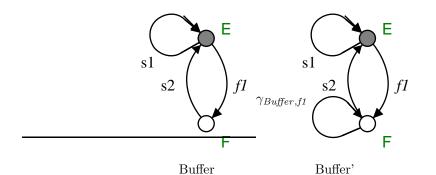


Figure 6.1: Transformation of Buffer

in a situation where  $v_j$  is allowed by P but not allowed by  $C_i$ . Thus, the controllability equation is converted from

$$\forall t, j : tv_j \in L(P) \land t \in L(C) \to tv_j \in L(C) \tag{6.1}$$

into

$$\forall t, i, j : t\gamma_{i,j} \notin L(P' \| C') \tag{6.2}$$

Every event  $\gamma_{i,j}$  introduced must have the property that it is not mentioned in the alphabet of any automaton A in the original model and thus is allowable in every state in the original model.

$$\forall A, t, i, j : t \in L(A) \to t\gamma_{i,j} \in L(A) \tag{6.3}$$

Next we describe how controllers are transformed from  $C_i$  into  $C'_i$ . In each controller  $C_i$  for every uncontrollable event  $v_j$  and for all states s in  $C_i$ , if there is no outgoing transition for  $v_j$  in s, we add the transition  $(s, \gamma_{i,j}, s)$ . Thus, for every trace t through the controller  $C_i$ , the event  $\gamma_{i,j}$  can occur in the modified controller  $C'_i$  if and only if  $v_j$  can't occur in  $C_i$ .

$$\forall t, i, j : t \in L(C_i) \land tv_j \notin L(C_i) \leftrightarrow t\gamma_{i,j} \in L(C'_i) \tag{6.4}$$

Also we never add a  $\gamma$  event related to any other controller. Therefore no controller can block another controller's  $\gamma$  event.

$$\forall t, i, j : t \in L(C'_i) \to \forall k \neq i : t\gamma_{k,j} \in L(C'_i) \tag{6.5}$$

Now we can also describe how a plant  $P_l$  is converted into its modified counterpart  $P'_l$ . In each plant  $P_l$  for every uncontrollable event  $v_j$  and for all states s where there exists an outgoing transition for  $v_j$ , we add the transition  $(s, \gamma_{i,j}, s)$  for every possible i. Therefore whenever the plant  $P_l$  would allow the event  $v_j$  it will also allow any  $\gamma$  event related to  $v_j$ .

$$\forall l, t, i, j : tv_j \in L(P_l) \leftrightarrow t\gamma_{i,j} \in L(P'_l) \tag{6.6}$$

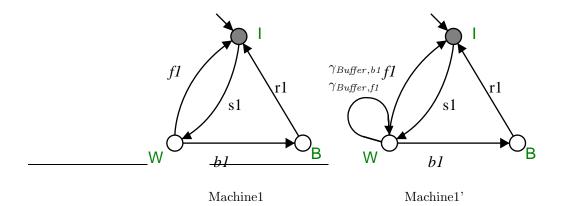


Figure 6.2: Transformation of Machine1

Further only selfloops with  $\gamma$  events are ever added to any automaton A in the model when converting it into A', and for each original automaton A in the model no  $\gamma$  event is ever referred to in its alphabet. Therefore rather than adding selfloops on states, we are actually deleting the implicit selfloops which were present on all the other states in A as described in "Running in Parallel" in Chapter 2.3. Therefore rather than adding to the language of A when converting it into A' we actually restrict its language.

$$\forall a: L(A') \subseteq L(A) \tag{6.7}$$

Furthermore, we can infer from (6.6) that  $t\gamma_{i,j}$  is in L(P') if and only if  $tv_j$  is in L(P). This is because  $t\gamma_{i,j}$  is in the language of every modified plant automaton  $L(P'_l)$  if and only if  $tv_j$  is in the language of each of the original plant automata  $L(P_l)$ .

$$\forall t, i, j : tv_j \in L(P) \leftrightarrow t\gamma_{i,j} \in L(P') \tag{6.8}$$

Similarly we can infer from (6.4) that  $t\gamma_{i,j}$  is in L(C') if and only if t is in L(C) and  $tv_j$  is not in L(C). This is because if t is in L(C) then t is in the language of all  $C_k$  and  $tv_j$  is not in L(C) only if there is some i for which  $tv_j$  is not in  $L(C_i)$ . Therefore from (6.4),  $t\gamma_{i,j}$  must be in  $L(C'_i)$ , and using the fact that t is in all  $L(C_k)$ , we can use (6.5) to infer that all other languages  $L(C'_k)$  also contain  $t\gamma_{i,j}$ .

$$\forall t, j : t \in L(C) \land tv_j \notin L(C) \leftrightarrow \exists i : t\gamma_{i,j} \in L(C')$$

$$(6.9)$$

To be able to use the modified version of the controllability problem (6.2) instead of the original controllability problem (6.1) we now prove that, if this transformation is used, they are equivalent.

**Proposition 1.** Let P be a plant model and let C be a controller model. Then (6.1) is equivalent to (6.2)

*Proof.* Firstly let us prove that if (6.1) is true then (6.2) must also be true.

Let us assume that (6.2 is false thus our claim does not hold. Therefore there must exist a trace  $t\gamma_{i,j}$  such that t contains no  $\gamma$  for which

$$t\gamma_{i,j} \in L(P' \| C')$$

Then  $t\gamma_{i,j}$  is an element of both L(P') and L(C').

$$t\gamma_{i,j} \in L(P') \land t\gamma_{i,j} \in L(C')$$
(6.10)

Then from the fact  $t\gamma_{i,j}$  is in L(P') we can use (6.8) to infer  $tv_j$  is in L(P).

$$tv_j \in L(P) \tag{6.11}$$

Also seeing as how  $t\gamma_{i,j}$  is in the language L(C'), t must also be in the language L(C'). Therefore we can use (6.7) to infer that t is in L(C)

$$t \in L(C) \tag{6.12}$$

Then from (6.11) and (6.12) we can use (6.1) to infer that  $tv_j$  is in L(C)

$$tv_j \in L(C) \tag{6.13}$$

However we can also infer that  $tv_j$  is not in L(C) using the fact that  $t\gamma_{i,j}$  is in the language L(C') and (6.9)

$$tv_j \notin L(C) \tag{6.14}$$

(6.13) and (6.14) clearly contradict each other. Therefore, if (6.1) is true then (6.2) is true also.

Now we must also prove that if (6.1) is false then (6.2) is also false.

To prove this we make the observation that (6.1) is only false if there exists a counterexample which shows that C is not controllable with respect to P.

$$\exists t, j : tv_j \in L(P) \land t \in L(C) \land tv_j \notin L(C)$$

$$(6.15)$$

We can then observe from (6.9) that for such a counterexample, there would have to exist the a trace  $t\gamma_{i,j}$  which is an element of  $L(C'_i)$  for some *i*.

$$\exists i : t\gamma_{i,j} \in L(C'_i) \tag{6.16}$$

Since  $tv_j \in L(P)$  we can infer from (6.8) that there must be a trace  $t\gamma_{i,j}$  in L(P') for all *i*.

$$\forall i : t\gamma_{i,j} \in L(P') \tag{6.17}$$

It follows that  $t\gamma_{i,j}$  is in both L(P') and L(C'), and from that  $t\gamma_{i,j}$  is also in L(C'||P').

$$t\gamma_{i,j} \in L(C' \| P') \tag{6.18}$$

This proves that if (6.1) is false then (6.2) is also false.

#### 6.2 Projection

Projection can be used to simplify an automaton by removing certain events [?, 9]. When we decide to project events out of an automaton, we first select the set of events  $\Sigma'$  from the alphabet of the automaton  $\Sigma$  to keep in the automaton. We then go through all the transitions in the automaton and label any transition labelled with an event not contained in  $\Sigma'$  with the non-event  $\tau$ . For our purposes, a transition labelled with  $\tau$  does not require any event to occur to travel along it. This modifies the language of the automaton, the trace  $\pi_{\Sigma'}(t)$  is in the language of the projected automaton. Here,  $\pi_{\Sigma'}(t)$  is the trace t with all events not in  $\Sigma'$  removed.

Thus for any trace t in the language of an automaton projected with respect to  $\Sigma'$ ,  $\pi_{\Sigma'}(L')$ , there must also exist a trace s such that s is in the language L of the automaton before projection, and if s has all the events in  $\Sigma'$  projected out of it, it will be equal to t.

$$\forall t : t \in \pi_{\Sigma'}(L') \to \exists s : t = \pi_{\Sigma'}(s) \land s \in L \tag{6.19}$$

Given a model made up of several automata we can select one of the model's automata to project with respect to  $\Sigma'$  preserving (6.3) under two conditions. Firstly all  $\gamma$  events must be in the set  $\Sigma'$ , as removing a  $\gamma$  event could cause uncontrollable behaviour to be hidden. Secondly, we may only leave an event outside the set  $\Sigma'$ , if that event is only mentioned in the alphabet of the automaton we have chosen to project the events out of. This is so that we don't introduce traces into the system which could otherwise be blocked by another automaton in the model. Unfortunately most events in most models occur in more than one automaton. Therefore, by the second condition we cannot remove them from any automata in the model. However, if an event occurs in only a few of the automata in the model, it is possible to replace those few automata in the model with their synchronous product, and then project the event out of that. For example if a model has 4 automata A, B, C, and D, and the event  $\beta$  only occurs in A and C then, if we want to project out the event  $\beta$ , we can compose A and C together so that the model is now made up of  $A \parallel C, B$ , and D. Then we can project  $\beta$  out of  $A \| C$ .

Once events are projected out of an automaton as described above the automaton is non-deterministic. Therefore we must determinise (convert into a deterministic automaton) the projected automaton using subset construction [8]. In most cases, the resultant automaton will be smaller than the original, in the worst case the resultant automaton could have exponentially more states than the original. This is rare however and in practice not much of an issue as if during subset construction we notice that the new automaton we are producing is getting to large we can simply terminate and try a different set of automata to compose and project. After this as an optional extra process we can attempt to minimise the automaton further by running the minimisation algorithm [9] on this automaton. This minimisation algorithm was chosen as it had the worst case time complexity of  $O(n \log(n))$  in the number of states.

#### 6.3 Iterative Projection

If it is required to check the controllability of a model which is made of several hundred automata, the ability to reduce a single automaton is unlikely to be enough to have a serious impact on our ability to check it. Fortunately, it is often possible to continue using projection on further automata in the model.

Consider for example that we have a model which consists of the automata which follow.

- A With the alphabet a, b
- B With the alphabet a, b, e
- C With the alphabet c, d, f
- D With the alphabet b, c, e
- E With the alphabet d, e, f

As automata A and B are the only automata with the event a contained in their alphabet, we can compose these two automata together and then project out the event a. After doing this we would have a model made up of the automata  $\pi_{\Sigma'_1}(A||B), C, D, E$  where  $\Sigma'_1 = \{b, e\}$ . Similarly automata C and E are the only ones whose alphabet contains d and f so we can compose and project these two automata so that we have the model  $\pi_{\Sigma'_1}(A||B), \pi_{\Sigma'_2}(C||E), D$ where  $\Sigma'_2 = \{c, e\}$ . Now, we can also notice that  $\pi_{\Sigma'_1}(A||B)$  and D are the only two automata which contain b thus we can compose and project these two to get  $\pi_{\Sigma'_3}(\pi_{\Sigma'_1}(A||B)||D), \pi_{\Sigma'_2}(C||E)$  where  $\Sigma'_3 = \{c, e\}$ . It should be noted that the series of projections given are not the only ones which could have been taken. For example on the previous step the automaton D could have been composed with  $\pi_{\Sigma'_2}(C||E)$  instead to remove the event c.

An algorithm for iteratively projecting out events in a model is given in Figure 6.3.

In this algorithm, we simply find every set of automata for which we can project out an event. Then we take the set of automata which we believe will give us the smallest projection. We evaluate a set of automata by the multiplying the number of states in each automaton together then raising that value to the power of the number of events which appear in at least one of the automata in the set but not in every automaton, and then say whichever set of automata has the smallest value of this is best. The rationale behind this metric is that the greater the number of states in each automaton, the greater the potential size of the final synchronous product, and that the more events which aren't common to each automata in the set the less related to one another the automata in the set are. Once we have selected a set of automata we generate its synchronous product, then calculate the smallest possible set of events for A is the set of automata in the model which we are considering to project events out of.  $\Gamma$  is the set of  $\gamma$  events introduced in Section 6.1. S is a set of sets of automata. Every set of automata contained in S represents a minimal set of automata to cover at least one event.

- 1. Set *attempts* to equal 0.
- 2. For all events  $\sigma$  in  $\Sigma$  except those in  $\Gamma$  find the set of all automata in A whose alphabet contains  $\sigma$  and add it to the set S, unless  $\sigma$  occurs in all automata in A.
- 3. Sort S such that the set of automata which is likely to be smallest when projected is listed first.
- 4. If S is empty then return A.
- 5. Remove the first set s from S and calculate its synchronous product *prod*, unless it is greater than *maxstates* \* 10, in which case go to 11.
- 6. Let the set of kept events  $\Sigma'$  be equal to  $\Gamma$  plus all events which occur in any automata not in s.
- 7. Create the automaton  $\pi_{\Sigma'}(prod)$
- 8. Set det to equal the determinised version of  $\pi_{\Sigma'}(prod)$  unless the number of states exceeds maxstates in which case go to 11.
- 9. Find the minimal version min of det using a minimisation algorithm.
- 10. Remove all elements of s from A, then add min to A and go to 1.
- 11. Increment *attempts*, then check to see whether *attempts* is greater than or equal to *maxattempts*, in which case return A. Otherwise go to 3.

#### Figure 6.3: Non-Exhaustive Iterative Projection

 $\Sigma'$ . Then we proceed to project and determinise the synchronous product with respect to  $\Sigma'$ . Finally we proceed to minimise using a minimisation algorithm then replace the automata we projected with the minimise automata and start the process again. However, during either the synchronous product step or the determinisation step, we may encounter an automaton which is larger than we are willing to deal with, in which case we try the next best set of automata, and so on. The stopping conditions are that we have no sets of automata left to look at, or we have attempted to generate automata which are too large too many times.

In some cases simply taking the first projection which we were capable of projecting successfully is not good enough. Thus the modified algorithm in Figure 6.4 can also be used. In this algorithm instead of guessing which set of automata will give us the smallest automaton after projection and minimisation we instead compose project and minimise every automaton within a certain range and choose the one which gave the smallest resulting automata at the end.

A is the set of automata in the model which we are considering to project events out of.  $\Gamma$  is the set of  $\gamma$  events introduced in Section 6.1. S is a set of sets of automata. Every set of automata contained in S represents a minimal set of automata to cover at least one event.

- 1. Set *smallest* and *smallset* to *null*.
- 2. For all events  $\sigma$  in  $\Sigma$  except those in  $\Gamma$  find the set of all automata in A whose alphabet contains  $\sigma$  and add it to the set S, unless  $\sigma$  occurs in all automata in A, or the set contains more automata than maxautomata.
- 3. If S is empty then go to 10. Otherwise remove the first set s from S and calculate its synchronous product *prod*, unless it is greater than *maxstates* \* 10 in which case go to 3.
- 4. Set the set of kept events  $\Sigma'$  to equal  $\Gamma$  plus all events which occur in any automata not in s.
- 5. Create the automaton  $\pi_{\Sigma'}(prod)$ .
- 6. Set det to equal the determinised version of  $\pi_{\Sigma'}(prod)$ , unless the number of states exceeds maxstates in which case go to 3.
- 7. Find the minimal version min of det using a minimisation function.
- 8. If min has less states than smallest or smallest is null replace smallest with min and smallset with s.
- 9. Go to 3.
- 10. Remove all elements of smallset from A then add smallest to A and go to 1.

Figure 6.4: Exhaustive Iterative Projection

Because of the differences between these two algorithms we call them Non-Exhaustive Iterative Projection and Exhaustive iterative projection respectively.

### 6.4 Extracting Traces

If there exists a trace which contains an event in  $\Gamma$  in the model before projection, there must also exist a trace in the model after projection which contains  $\Gamma$ . Unfortunately the trace found in the projected model may not be a proper counterexample for the original system. Fortunately using (6.19) we know that, for any trace t through a projected automaton, there must also exist a trace sthrough the original automaton such that  $t = \pi_{\Sigma'}(s)$ . Therefore we can attempt to insert events not in the set  $\Sigma'$  into the trace t in such a way as to find a trace s which is accepted by the original automaton. It should be pointed out, that seeing as how any events not in  $\Sigma'$  do not occur in any other automata, we can insert them anywhere into the trace without worrying that it might cause another automaton to reject the trace. Figure 6.5 outlines an algorithm for finding such a trace. This algorithm basically consists of a breadth first search through the automaton to find a trace which will both be accepted by the automaton and is a reverse projection of t. To do this we keep a queue of tuples of a state we have reached, the number of steps through the original trace t we have gotten, and the events we followed to get there. To start with the queue contains a tuple consisting of the initial state, 0 and the empty trace. When we look through the tuples in this queue we consider whether we can move from the state in the tuple to another state in the automaton using either the current event in t or any one of the events not contained in  $\Sigma'$  and if we can we add a tuple for the new state we can get to, how many events in the original trace we have consumed, and the trace to get to this new state on to the end of the queue. It should be noted that we only ever add a tuple to our queue if we haven't already added a tuple with the same state and index into the old trace, this is because finding a state from which we can consume the next event in tfrom a given state is in no way dependent on the trace followed to get to that state. To save time on string copying instead of creating a new string of events s for each node we can just represent s as the event we are adding on to the end of our string plus a pointer to the old string. Because we only look at a node if we haven't already explored one with the same state and depth through t. this algorithm has worst case complexity of O(n \* |t| \* e). where n is the number of states in A, |t| is the length of the trace t, and e is the number of events not in  $\Sigma'$ .

Now if we have a counterexample for a model which has been iteratively projected, we can use the algorithm in Figure 6.6 to find a correct counterexample. Here we just use the algorithm in Figure 6.5 to find the trace before projection for the last automaton we projected using either the algorithm in Figure 6.3 or 6.4. Then we continue to use the new trace with the second to last automaton and so forth. This algorithm of course requires that we remember what automata we projected with respect to which events.

### 6.5 **Projecting Checker**

Now that we have actually defined what projection is and how to transform the automata in the model to take advantage of it, we can go into how we use these facts in an algorithm for checking the controllability of a system. Figure 6.7 is a description of the Modular Projecting Controllability algorithm. We can notice that the algorithm is very similar to the algorithm in Figure 3.1 for modular controllability checking. The main difference being simply that before we check

Let t be a counterexample found in the model made of the events  $\sigma_0, \sigma_1 \dots \sigma_{n-1}$ where n is the length of the trace t, also let A be the original automaton before it was projected let Q be a queue of tuples of states in A, length through t, and built-up trace, and let S be a set of pairs of state and length through t, and  $\Sigma'$ be the set of kept events.

- 1. Add the tuple (initial state(A), 0, []) to Q and (initial state(A), 0) to S.
- 2. Remove the first tuple (state, i, s) in Q.
- 3. If i = n return s.
- 4. If there is an outgoing transition from *state* labelled with  $\sigma_i$  to *next* add  $(next, i+1, s\sigma_i)$  to Q and (next, i+1) to S unless  $(next, i+1) \in S$
- 5. For every event  $\alpha$  not in  $\Sigma'$ , if there is an outgoing transition from state labelled with  $\alpha$  to next, then add (next,  $i, s\alpha$ ) to Q and (next, i) to S unless (next, i)  $\in S$ .
- 6. Go to 2.

#### Figure 6.5: Find Trace Algorithm

the controllability of S we now reduce the size of S using projection first and that because of this whenever we get a counterexample we must also convert it back into a trace for the original system.

Once again, the methods of choosing automata in 3 and 6 are the same as those already discussed above in Chapter 3.

An alternative algorithm is to simply use iterative projection on the entire model to begin with and then use a regular modular controllability checker on the results. Then if the system is found to be not controllable, the counterexample is converted back.

### 6.6 Caching

If we look at the algorithm for iterative projection in Figure 6.4, as we have to project every set of automata in the set S and we do this for every iteration of the algorithm we will find that on each subsequent iteration we will often have to compute a projection which we have already calculated on previous iterations. Clearly, it is wasteful for us to do work which we have already done. Thus, when we do a projection we cache the results remembering that this set of automata when projected with respect to this set of events results in this minimise automaton, or that its resultant automaton will exceed the state limit. Then, whenever we project a set of automata we can check the cache to see if we have already attempted this projection before, and if we have, quickly retrieve the resultant automaton or realise that it is bigger than we are willing to look

Let  $A_1, \ldots, A_n$  be the automata simplified by iterative projection, and let  $\Sigma'_i$  be the set of events we projected  $A_i$  with respect to, and let t be the projected trace.

- 1. set i to equal n
- 2. If i equals 0 return t
- 3. find the trace s using the algorithm in Figure 6.5 with  $A_i$  and  $\Sigma'_i$  as input.
- 4. set the new value of t to s, and decrement i, then go to 2

Figure 6.6: Iterative Find Trace Algorithm

at.

Furthermore, if we look at the controllability algorithm outlined in Figure 6.7 we will have to run one of the iterative projection algorithms on every subsequent composition S. Seeing as how most of the time every subsequent composition S is the same as the previous composition just with an extra automaton, it also follows that it is likely that when we run the iterative projection algorithms on any composition S, that at least some of the projections which will have to be carried out on S, will have already been done for the previous composition. Thus, when using either iterative projection algorithm, we can cache the results of the projections we carried out on the previous composition to help when projecting the current composition. To save memory, however, it is a good idea that, after we finish running the iterative projection algorithm on a composition, to remove from the cache any stored projections which weren't looked at when iteratively projecting that composition.

### 6.7 Results

The algorithms discussed in the previous section have been run to gather data as to how well the perform under various configurations. For all tables in this section, when deciding which controller to prove first the largest is always chosen to save time when gathering data and because the trend in previous results suggested that no interesting results would be found by looking at results for proving the smallest controller first as well. Further seeing as how all controllers have been converted into plants into the transformation step in makes no difference whether we choose the prefer plant mode of the heuristics or the no preference mode. Also when dealing with non-exhaustive iterative projection the maximum number of projections we attempt before we give up is always set to two, and for dealing with exhaustive iterative projection the maximum number of automata composed is always set to four.

It should be noted that the number of states which had to be explored by the checker in the tables is not as good an indicator of performance as in the C' equals the set of modified Controller automata in the model and P' the set of modified Plant automata, and S is the set of composed automata.

- 1. Set the set S as being empty.
- 2. If C' is empty, the model has been proven controllable. Otherwise take an automaton  $C'_i$  from the set C' and add it to S. Also create a property  $p_i$  with only a single state which specifies that no  $\gamma$  event related to  $C_i$  can occur.
- 3. Use either algorithm in Section 6.3 to convert S into S'
- 4. Check controllability of S' with respect to  $p_i$  using the monolithic method. consider the automaton  $p_i$  as being a controller and all other automata as plants.
- 5. If no counterexample for S' was found go to 9. Otherwise set t' to be the counterexample found by the controllability check.
- 6. Use the algorithm in Section 6.6 to convert t' into t.
- 7. Set the set N to contain all automata in P and C which would not accept the counterexample t.
- 8. If N is empty then the model has been proven not controllable, and t represents a counterexample in the system. Otherwise pick a subset of N to add to S then go to 3.
- 9. For all elements of S if they are also an element of C, remove them from C and add them to P. Then go to 2.

#### Figure 6.7: Modular Projecting Controllability Checker Algorithm

previous sections. This is because, for the other checkers the lion's share of the work was performed while creating the synchronous product, whereas for the projecting checker it is quite possible that the majority of the work could be spent projecting, determinising, or minimising the automata.

Again it appears that all the heuristics are comparable to one another in their overall effectiveness. When looking at the performance of the algorithm used to produce Table 6.3 we can see that it has very good performance although it takes slightly longer than the standard modular controllability checker for the smaller problem. For example, where the standard modular controllability checker took 0.05 seconds to prove big\_bmw the projecting checker took 0.18 seconds. However, for the larger models which the standard checker has trouble solving, the projecting checker seems to be able to solve faster and furthermore is capable of solving most of the models in the table regardless of which heuristic it is using. That said, for the profisafe series of models there are certain cases in which the projecting checker algorithm takes much longer than it should. C' equals the set of modified Controller automata in the model, and P' the set of modified Plant automata, and S is the set of automata specifying events in  $\Gamma$  can't happen.

- 1. Set the set S as being empty.
- 2. For every automaton  $C'_i$  in C' add an automaton with only a single state which specifies that no  $\gamma$  event related to  $C_i$  can occur, to the set S.
- 3. Use either algorithm in Section 6.3 to convert the union of the sets P' and C' into projected.
- 4. Run the modular controllability algorithm outlined in Figure 3.1 using *projected* as the set of plant automata and S as the set of controllers.
- 5. If no counterexample was found, the model has been proven controllable. Otherwise set t' to be the counterexample found by the controllability check.
- 6. Use the algorithm in Section 6.6 to convert t' into t.
- 7. Return t as the counterexample to the system.

Figure 6.8: Modular Controllability Checker using Projection as a Pre-Process

Then looking at Table 6.4, we can see that for the modular projecting checker algorithm when used in conjunction with the exhaustive iterative projection algorithm, it doesn't seem to give any better results. It only seems that in some case the algorithm takes far longer to complete, suggesting that it should only really be necessary to use this algorithm when attempting to solve models which are unsolvable using the non-exhaustive iterative projection algorithm.

Next, we look at using non-exhaustive iterative projection as a pre-process before giving the problem to a standard modular checker as in Table 6.5. This seems to either work better than the modular projecting checker or otherwise work a lot worse. An example of when it works a lot better than the modular projecting checker is when solving tbed\_nocoll and tbed\_noderail with the Early-NotAccept heuristic here the modular projecting checker took roughly 3 minutes for both of them whereas the pre-process checker took 10 seconds. However, it was incapable of solving rhone\_tough with any heuristic.

Further, we go on to Tables 6.6 and 6.7. These tables show results for solving controllability problems for both the algorithm modular projection algorithm and the pre-process algorithm. Both use the non-exhaustive iterative projection algorithm with varying values for the maximum number of states projected. In both cases the MaxCommonEvents heuristic is used. Only the tbed series of models and rhone\_tough are considered in these tables as these are the models which require the most effort. From looking at these tables, we see that generally as we increase maxstates the time required to solve a model increases although for Table 6.6 we see that for rhone\_tough it is in fact impossible to solve this problem with the lower state limits for projection and for tbed\_uncont while it is possible to be solved with a state limit of 100 it is in fact faster to solve with a state limit of 200. This suggests that there is a point at which the benefits of minimising automata using projection are outweighed by its extra overhead of projecting automata and determinising them. Also when the time taken seems to remain static it can probably be put down to the fact that projecting automata that are any larger than a certain maximum number of states never comes up.

Furthermore in Tables 6.8 and 6.9 we see results for using iterative projection to simplify a model before giving it to a standard monolithic controllability checker. The first table used standard iterative projection whereas the second used exhaustive iterative projection. It should be noted that whereas the measure of states in the previous tables takes into account those states explored in the projection steps, these tables only take into account the states explored in the final exploration of the synchronous product. This is so that we can get an idea of just how much the total synchronous product has been reduced by the projection. The results are surprisingly good with it being possible to reduce many models to the point where they possess one state and no transitions at all. This is quite impressive given that all of these models are so large as to be impossible to be solved using a regular controllability checker and thus have synchronous products which are at least have a total of ten million states most having significantly more. In the case of rhone\_tough it wasn't even possible to solve it using modular or any other method for proving controllability for that matter. This also somewhat showcases the merits of the exhaustive method of iterative projection, where the standard model proved incapable of reducing the state space of certain models below two million states such as tbed\_ctct and many of the profisafe models. Exhaustive was capable of reducing many of these automata to a reasonable size, or even to the point where they contained no uncontrollable events using a state limit of just 100 or 200. That said, in general if it was capable of solving the problem once again non-exhaustive ran faster than exhaustive. Figures 6.9 to 6.12 show charts of both the states in simplified thed\_ctct and rhone\_tough for the two methods and the time to solve them. They both clearly show diminishing reduction in size for in the simplified model as max states increases. Also of note is the sharp increase in the time required to solve a model for exhaustive iterative projection as max states increases suggesting that when using this method special care should be taken to use a small number of for max states.

It should be noted that both profisafe\_i4 and profisafe\_o4 in addition to their controllability problems also have language inclusion problems. It turns out that these problems are in fact much harder to prove than there controllability problems, and in fact are very difficult to solve even using projection. Actually, while profisafe\_i4 was capable of being solved by the projecting checker after roughly 10 minutes, a configuration capable of solving profisafe\_o4 has not been found.

Table 6.1
MODULAR PROJECTING LANGUAGE INCLUSION, NON-EXHAUSTIVE,
MAX PROJECTION 1000

Model				Iodular									
		A	11	Eas	~	La	te		ommon	Ma		Μ	lin
				NotA	$\operatorname{ccept}$	NotA	$\operatorname{ccept}$	Eve	ents	Sta	tes	Eve	ents
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
profisafe_i4_slave	15	1695	3.01	6194	2.42	4982	5.18	8656	6.03	15495	7.58	2063	1.64
profisafe_04_slave	17	2330	7.26	6021	3.22	38609	11.09	4850	4.78	15275	9.49	14868	8.8
big_bmw	32	926	0.46	89	0.14	114	0.12	73	0.12	118	0.12	92	0.15
ftechnik	37	4532	5.99	2529	3.81	16498	26.98	13162	17.48	899	8.46	2743	6.21
tbed_nocoll	85	13490	42.6	343604	296.92	76	14.74	106	1.99	141	11.51	74	82.07
tbed_noderail	85	11564	18.38	30887	86.12	5893	140.89	574	26.57	743	74.88	12042	145.09
verriegel4	66	2812	0.99	174	0.07	200	0.09	330	0.15	175	0.07	201	0.1
profisafe_i4_host	29	33249	4.74	49386	45.2	3931	11.19	11697	11.2	29627	12.91	35044	11.94
profisafe_04_host	31	17870	8.14	33805	13.22	9552	5.73	2874	7.04	25404	13.44	19681	24.79
profisafe_i5_host	29	39108	6.09	24482	22.84	4958	21.41	8787	16.42	17257	58.44	46586	24.76
profisafe_o5_host	31	20470	8.67	47540	16.22	4801	9.5	3632	12.89	11080	17.35	54604	23.65
profisafe_i6_host	29	44908	7.59	14296	52.6	5069	22.2	15970	28.04	29267	50.14	90160	36.19
profisafe_06_host	31	23102	10.11	97728	63.09	15015	88.12	20261	25.2	14570	44.48	85031	25.2
Model		Mi	n	M	in	М	in	One		RelMax			
		NewE	vents	Sta	tes	Trans	itions			Com	mon		
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time		
profisafe_i4_slave	15	6674	4.28	1495	1.64	2931	2.09	2075	2.24	1232	5.7		
profisafe_04_slave	17	8124	10.43	27916	6.21	6227	2.8	15067	9.11	16552	7.13		
big_bmw	32	73	0.09	68	0.07	92	0.12		0.12				
ftechnik	37		10.62	5299	16.74		5.39		4.71		10.73		
tbed_nocoll	85	88	21.79	158	83.78	74	171.02	1239	87.95	99	11.29		
tbed_noderail	85			9595		146540	97.5		154.69		30.98		
verriegel4	66	202	0.1	184	0.08	201	0.1	200	0.09	179	0.07		
profisafe_i4_host	29	8295		5126	7.87	24567		51868			-		
profisafe_04_host	31	3521	9.18	3685	13.29	16954	23.34	52057					
profisafe_i5_host	29		15.02	14115	28.78	41712	15.7	28415	76.19	2846	22.06		
profisafe_o5_host	31	4529		4814	9.88	78219		15792	19.33	4507			
profisafe_i6_host	29	15607	33.67	5161	22.3	55752	19.64	20969	80.42	2562	12.39		
profisafe_06_host	31	5108	18.7	10775	25.55	81239	101.16	19476	50.52	3033	14.91		

Table 6.2
MODULAR LANGUAGE INCLUSION USING NON-EXHAUSTIVE
PROJECTION AS PRE-PROCESS, MAX PROJECTION 1000

Model		Modular	langu	age incl	usion,	non-ext	nausti	ve projec	tion a	s pre-pro	cess,	max pro	jection 1000
		All		Earl	ly	Lat	te	MaxCor	nmon	Ma	x		Min
				NotAc	$_{\rm cept}$	NotAc	ccept	Ever	nts	Stat	$\mathbf{es}$	H	Events
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
profisafe_i4_slave	15	1699	3.3	1699	2.68	1699	2.36	1699	2.32	1699	2.25	1699	2.34
profisafe_04_slave	17	3548	4.27	3548	4.32	3548	4.2	3548	4.32	3548	4.37	3548	4.45
big_bmw	32	1498	0.53	1498	0.54	1498	0.54	1498	0.54	1498	0.71	1498	0.52
ftechnik	37	91260	11.91	91713	13.52	207322	15.7	164277	14.78	96446		116379	13.46
tbed_nocoll	85	631197	68.93	1752235	79.95		55.34				64.37		62.54
tbed_noderail	85	305898	30.44	470839	33.71		31.97	377208	31.81	401580	33.14		33.11
verriegel4	66	6062	1.27	6063	1.39	6062	1.24	6062	1.4	6062	1.23	6063	1.4
profisafe_i4_host	29	6723	10.97	6723	10.16	6723	9.82	6723	10.01	6723	9.77	6723	9.99
profisafe_o4_host	31	7971	11.75	7971	11.26	7971	11.09	7971	11.07	7971	11.34	7971	11.26
profisafe_i5_host	29	7098	16.34	7098	16.24	7098	16.6	7098	16.76	7098	16.85	7098	16.89
profisafe_o5_host	31	8074	14.18	8074	13.98	8074	13.58	8074	13.6	8074	13.58	8074	13.53
profisafe_i6_host	29		27.58	7353	27.3	7353	27.6	7353	27.67	7353	27.74	7353	27.51
profisafe_o6_host	31	8209	16.79	8209	16.63	8209	16.58	8209	16.46	8209	16.34	8209	16.49
Model		Mii	1	Mii	ı	Mi	n	On	е	RelM	ax		
		NewEv	rents	Stat	es	Transi	tions			Comn	non		
		States		States				States		States	Time		
profisafe_i4_slave	15	1699		1699	2.42		-	1699			2.51		
profisafe_04_slave	17	3548		3548				3548			4.52		
big_bmw	32	1498									0.53		
ftechnik	37	244026			13.11	113521		166371					
tbed_nocoll	85	4672136			47.18			5058519	86.88	2394067			
tbed_noderail	85		32.73		24.43		24.59			2088487	38.1		
verriegel4	66	6063	-	6063				6062			1.24		
profisafe_i4_host	29		10.04	6723				6723			9.95		
$profisafe_04_host$	31		10.78		10.76		11.07		11.24		10.73		
profisafe_i5_host	29	7098			16.58		16.61		16.56				
$profisafe_05_host$	31	8074			13.51		13.48		13.44		13.43		
$profisafe_i6_host$	29		27.52				27.49		27.47		27.19		
profisafe_06_host	31	8209	16.36	8209	16.53	8209	16.38	8209	16.54	8209	16.35		

Table 6.3
MODULAR PROJECTING CONTROLLABILITY, NON-EXHAUSTIVE, MAX
PROJECTION 1000

Model			Modula All		ting co	ntrollabi	lity, no	n-exhaus	tive, m	ax proje	ection		
		Al	1	Ear		Lat				MaxCo			
				NotAc		NotAc	*	Eve		Unco		Stat	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States		States	Time
big_bmw	31	269	0.32	328	0.2	314	0.18	323	0.18	264	0.15	314	0.17
fzelle	67	1090	0.29	744	0.24	700	0.24	875	0.26		0.25	655	0.23
rhone_alps	35	429	0.16	902	0.43	557	0.23	316	0.15	388	0.18	445	0.2
tbed_ctct	84	2093	0.62	323	0.23	26454	6.61	323	0.22	532	0.31	38028	5.39
tbed_nocoll	84	129556		1253502		476532	97.63			297005		404925	62.9
tbed_noderail	84	145612		1114607		269866	43.45	118250		250258		525335	86.98
verriegel4	65	1084	0.33	2932	1.42	1062	0.34	1147	0.35	2360	1.43	2761	2.12
profisafe_i4	80	81	0.17	401	0.51	1335	4.44	37	0.13		40.73	37	0.14
profisafe_i4_host	28	74	0.13	138	0.14	337	0.56		0.09	95	0.17	32	0.09
profisafe_i4_slave	14	7	0.04	105	0.07	5	0.03	5	0.03	5	0.04	5	0.03
profisafe_i5	88	98	0.19	192	0.27	8630	4.81	37	0.16		1.53	37	0.16
profisafe_i5_host	28	91	0.14	138	0.17	1070	3.56	32	0.11	3344	7.16	32	0.11
profisafe_i6	94	98	0.23	197	0.28	304	0.78	37	0.18	13889	24.23	37	0.18
profisafe_i6_host	28	91	0.16	1223	1.16	7990	12.91	32	0.13	3287	11.5	32	0.12
profisafe_inclusion_i4host	78	103	0.15	477	0.49	44	0.12	44	0.12		0.39	86	0.16
profisafe_inclusion_o4host	84	103	0.17	248	0.2	44	0.13	44	0.13	227	0.41	179	0.31
profisafe_inclusion_o4slave	84	103	0.17	658	0.82	44	0.13	44	0.13	165	0.27	86	0.17
profisafe_04	90	81	0.19	286	0.29	860	1.87	37	0.15	189	0.28	37	0.15
profisafe_04_host	30	74	0.13	1550	1.43	102	0.2	32	0.1	102	0.19	32	0.1
profisafe_o4_slave	16	7	0.05	59	0.08	5	0.04	5	0.05	5	0.04	5	0.05
profisafe_o5	- 99	98	0.21	1293	1.33	134	0.33	37	0.17	187	0.33	37	0.18
profisafe_o5_host	- 30	91	0.14	642	0.6	1027	3.49	32	0.11	6512	5.71	32	0.12
profisafe_06	106	98	0.25	235	0.34	124	0.38	37	0.2	124	0.38	37	0.2
profisafe_o6_host	- 30	91	0.16	181	0.25	1170	5.06	32	0.13	277	0.39	32	0.13
ftechnik	- 36	25484	3.52	6795	2.98	26445	4.48	25307	4.77	6776	3.09	66800	10.09
rhone_tough	61	453398	6.14			1679910	19.11	175489		636432	8.78		6.13
_				a . a a w .						a = 1 + 4 a			11.00
tbed_uncont	84	176777	12.03	842054	114.53	490531	36.37	292917	30.87	274112	28.58	340548	44.68
tbed_uncont Model	84	176777 Mi		842054 Mi		490531 Mi		292917 Mi		274112 Or		340548 RelN	
	84		n		n		n		n				ſax
	84 Aut	Mi	n	Mi	n	Mi	n	Mi	n			RelN	ſax
Model		Mi Ever	n nts	Mi NewE	n vents	Mi Stat	n tes	Mi Transi	n tions	Or	ne	RelN Comr	fax non
Model Name	Aut	Mi Ever States	n nts Time	Mi NewEv States	n vents Time	Mi Stat States	n tes Time	Mi Transi States	n tions Time	Or States	ne Time	RelN Comr States	fax non Time
Model Name big_bmw	Aut 31	Mi Ever States 281	n nts Time 0.15	Mi NewEv States 281	n vents Time 0.15	Mi Stat States 282	n Time 0.14	Mi Transi States 281	n tions Time 0.14	Or States 272	ne Time 0.15	RelN Comr States 277	fax non Time 0.14
Model Name big_bmw fzelle	Aut 31 67	Mi Even States 281 966	n nts Time 0.15 0.28	Mi NewEv States 281 892	n vents Time 0.15 0.26	Mi Stat States 282 1241	n Time 0.14 0.37	Mi Transi States 281 1256	n tions Time 0.14 0.37	Or States 272 863	Time 0.15 0.24	RelN Comr States 277 892	fax non Time 0.14 0.26
Model Name big_bmw fzelle rhone_alps	Aut 31 67 35	Mi Even States 281 966 458	n nts Time 0.15 0.28 0.16 6.37	Mi NewEv States 281 892 289	n vents 0.15 0.26 0.12	Mi States 282 1241 533	n Time 0.14 0.37 0.21 5.08	Mi Transi States 281 1256 533 17414	n tions Time 0.14 0.37 0.21 4.83	Or States 272 863 458	Time 0.15 0.24 0.16 6.94	RelN Comr States 277 892 278	fax non Time 0.14 0.26 0.1
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll	Aut 31 67 35 84	Mi Even States 281 966 458 30451	n nts <u>Time</u> 0.15 0.28 0.16 6.37 236.95	Mi NewEy States 281 892 289 21896	n vents Time 0.15 0.26 0.12 4.42	Mi States 282 1241 533 8098 986750	n Time 0.14 0.37 0.21 5.08 115.62	Mi Transi States 281 1256 533 17414	n tions Time 0.14 0.37 0.21 4.83 185.36	Or States 272 863 458 36406	Time 0.15 0.24 0.16 6.94 50.43	RelN Comr States 277 892 278 6121	fax non <u>Time</u> 0.14 0.26 0.1 1.63 33.13
Model Name big_bmw fzelle rhone_alps tbed_ctct	Aut 31 67 35 84 84	Mi Even States 281 966 458 30451 1594044	n nts <u>Time</u> 0.15 0.28 0.16 6.37 236.95	Mi NewEv States 281 892 289 21896 475835	n vents <u>Time</u> 0.15 0.26 0.12 4.42 54.75	Mi States 282 1241 533 8098 986750	n Time 0.14 0.37 0.21 5.08 115.62	Mi Transi 281 1256 533 17414 1391084	n tions Time 0.14 0.37 0.21 4.83 185.36	Or States 272 863 458 36406 265472	Time 0.15 0.24 0.16 6.94 50.43	RelM Comr States 277 892 278 6121 277491	fax non <u>Time</u> 0.14 0.26 0.1 1.63 33.13
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail	Aut 31 67 35 84 84 84	Mi Even 281 966 458 30451 1594044 1345867	n Time 0.15 0.28 0.16 6.37 236.95 191.09	Mi NewEv States 281 892 289 21896 475835 406660		Mi States 282 1241 533 8098 986750 946799	n Time 0.14 0.37 0.21 5.08 115.62 119.49	Mi Transi States 281 1256 533 17414 1391084 1352890	n Time 0.14 0.37 0.21 4.83 185.36 184.28	Or States 272 863 458 36406 265472 320888	Time 0.15 0.24 0.16 6.94 50.43 55.1	RelM Comr States 277 892 278 6121 277491 275954	fax non 0.14 0.26 0.1 1.63 33.13 26.89
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4	Aut 31 67 35 84 84 84 65	Mi Even 281 966 458 30451 1594044 1345867 1036	n Time 0.15 0.28 0.16 6.37 236.95 191.09 0.31	Mi NewEv 281 892 289 21896 475835 406660 1095		Mi States 282 1241 533 8098 986750 946799 1095 383	n Time 0.14 0.37 0.21 5.08 115.62 119.49 0.36 1.05	Mi Transi States 281 1256 533 17414 1391084 1352890 1145	n Time 0.14 0.37 0.21 4.83 185.36 184.28 0.41	Or States 272 863 458 36406 265472 320888 2360	$\begin{array}{c} \text{Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095	fax non Time 0.14 0.26 0.1 1.63 33.13 26.89 0.36
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noclerail verriegel4 profisafe_i4_host	Aut 31 67 35 84 84 84 65 80	Mi Ever 281 966 458 30451 1594044 1345867 1036 96	n nts <u>Time</u> 0.15 0.28 0.16 6.37 236.95 191.09 0.31 0.2	Mi NewEv States 281 892 289 21896 475835 406660 1095 37		Mi States 282 1241 533 8098 986750 946799 1095	n Time 0.14 0.37 0.21 5.08 115.62 119.49 0.36	Mi Transi 281 1256 533 17414 1391084 1352890 1145 196	n tions Time 0.14 0.37 0.21 4.83 185.36 184.28 0.41 0.24	Or States 272 863 458 36406 265472 320888 2360 4790	Time 0.15 0.24 0.16 6.94 50.43 55.1 1.4 40.72	Relly Comr States 277 892 278 6121 277491 275954 1095 37 32	fax non <u>Time</u> 0.14 0.26 0.1 1.63 33.13 26.89 0.36 0.13
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave	Aut 31 67 35 84 84 84 65 80 28 14	Mi Even 281 966 458 30451 1594044 1345867 1036 96 32 5	n nts <u>Time</u> 0.15 0.28 0.16 6.37 236.95 191.09 0.31 0.2 0.09 0.03	Mi NewEv 281 892 289 21896 475835 406660 1095 37 32 5	n vents <u>Time</u> 0.15 0.26 0.12 4.42 54.75 41.7 0.36 0.13 0.1 0.03	Mi States 282 1241 533 8098 986750 946799 1095 383 19223 5	$\begin{array}{c} n \\ \overline{\text{Time}} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \end{array}$	Mi Transi 281 1256 533 17414 1391084 1352890 1145 196 32 105	n tions Time 0.14 0.37 0.21 4.83 185.36 184.28 0.41 0.24 0.09 0.07	Or States 272 863 458 36406 265472 320888 2360 4790 95 5	Time 0.15 0.24 0.16 6.94 50.43 55.1 1.4 40.72 0.17 0.03	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \text{Time} \\ 0.14 \\ 0.26 \\ 0.1 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \end{array}$
Model Name big.bmw fzelle rhone.alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5	Aut 31 67 35 84 84 84 65 80 28 14 88	Mi Ever 281 966 458 30451 1594044 1345867 1036 96 32 5 2195	n nts <u>Time</u> 0.15 0.28 0.16 6.37 236.95 191.09 0.31 0.2 0.09 0.03 1.38	Mi NewE- States 281 892 289 21896 475835 406600 1095 37 32 5 37	n vents Time 0.15 0.26 0.12 4.42 54.75 41.7 0.36 0.13 0.1 0.03 0.16	Mi States 282 1241 533 8098 986750 946799 1095 383 19223 5 3357	$\begin{array}{c} n \\ \overline{\text{Time}} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \end{array}$	Mi Transi 281 1256 533 17414 1391084 1352890 1145 196 32 105 123	n tions Time 0.14 0.37 0.21 4.83 185.36 184.28 0.41 0.24 0.09 0.07 0.22	Or States 272 863 458 36406 265472 320888 23600 4790 95 5 2189	Time 0.15 0.24 0.16 6.94 50.43 55.1 1.4 40.72 0.17 0.03 1.5	RelM Comr States 277 892 278 6121 275954 1095 37 32 5 37	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \\ \hline \\ 0.14 \\ 0.26 \\ 0.1 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host	Aut 31 67 35 84 84 84 65 80 28 14 88 28	Mi Even 281 966 458 30451 1594044 1345867 1036 96 32 5 2195 32	$\begin{array}{c} n \\ \hline n \\ mts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \end{array}$	Mi NewE- 281 892 2899 21896 475835 406660 1095 37 32 5 37 32 37	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \end{array}$	Mi States 282 1241 533 8098 986750 946799 1095 383 19223 5 3357 375	$\begin{array}{c} n \\ \overline{\text{tess}} \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \\ \\ \hline \\$	Mi Transi States 281 1256 533 17414 1391084 1352890 1145 196 32 105 123 32	$\begin{array}{c} n \\ \hline tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \end{array}$	Or States 272 863 458 36406 265472 320888 2360 4790 95 5 2189 3344	Time 0.15 0.24 0.16 6.94 50.43 55.1 1.4 40.72 0.17 0.03 1.5 7.23	RelM Comr States 277 892 278 6121 277491 275954 10955 37 32 5 37 32 37	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \textbf{Time} \\ 0.14 \\ 0.26 \\ 0.1 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5 profisafe_i5 profisafe_i5_host profisafe_i6	Aut 31 67 35 84 84 84 65 80 28 14 88 28 14 88 28 94	Mi Even 281 966 458 30451 1594044 1345867 1036 96 32 5 2195 32 43	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \end{array}$	Mi NewE- 281 892 2899 21896 475835 406660 1095 37 32 5 5 37 32 37	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \end{array}$	Mii States 282 1241 533 8098 986750 946799 1095 383 19223 5 3357 3355 8847	$\begin{array}{c} n \\ \overline{\text{tess}} \\ \hline \text{Time} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \end{array}$	Mi Transi 281 1256 533 17414 1391084 1352890 1145 196 32 105 1233 32 91		Or States 272 863 458 36406 265472 320888 2360 4790 95 5 2189 3344 13889	Time 0.15 0.24 0.16 6.94 50.43 55.1 1.4 40.72 0.17 0.03 1.5 7.23 23.67	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \textbf{Time} \\ 0.14 \\ 0.26 \\ 0.1 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_ profisafe_i5_host profisafe_i6_ profisafe_i6_host	Aut 31 67 35 84 84 84 85 80 28 14 88 28 94 28	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 32 5 2195 32 43 32	$\begin{array}{c} n \\ mats \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \end{array}$	Mi NewE- States 281 892 289 21896 475835 406660 1095 37 32 5 37 32 37 32 37 32	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \end{array}$	Mii States 282 1241 533 8098 986750 946799 1095 383 19223 5 3357 3755 8847 12944	$\begin{array}{c} n \\ \hline {\rm Time} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \end{array}$	Mi Transi States 281 1256 533 17414 1391084 1352890 1145 196 32 105 123 32 91 32	$\begin{array}{c} n \\ \hline tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \end{array}$	Or States 272 863 458 36406 265472 320888 2360 4790 95 5 2189 3344 13889 3287	Time 0.15 0.24 0.16 6.94 50.43 55.1 1.4 40.72 0.17 0.03 1.5 7.23 23.67 11.29	RelM Comr States 277 892 278 6121 277491 275954 10955 37 32 5 37 32 37	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \\ \hline \\ \hline \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_noderail verriegel4 profisafe_i4 profisafe_i4_alsave profisafe_i5_host profisafe_i5_host profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_i6_host	Aut 31 67 35 84 84 84 65 80 28 80 28 14 88 28 94 28 78	Mi Even States 281 9666 458 30451 1594044 1345867 1036 966 322 5 2195 32 433 322 433	$\begin{array}{c} n \\ mats \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \end{array}$	Mii NewE- States 281 892 2899 21896 475835 406660 1095 377 322 5 377 32 377 32 377	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \end{array}$	Mi States 282 1241 5333 8098 986750 946799 1095 3833 19223 5 3357 3357 3357 375 8847 12944 163	$\begin{array}{c} n \\ \overline{\text{Time}} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \end{array}$	Mi Transi States 281 1256 533 17414 1391084 1352890 1145 1966 322 105 123 32 91 322 91 322 160	$\begin{array}{c} n \\ \hline tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \end{array}$	Or States 272 863 36406 265472 320888 23600 47900 95 5 2189 3344 13889 3287 260	$\begin{array}{c} {\rm Time} \\ 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \end{array}$	RelM Comr States 277 8922 278 6121 277491 275954 1095 37 32 5 37 32 37 32 37 32 99	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \text{Time} \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.03 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	Autt 31 67 35 84 84 84 65 80 28 84 14 88 28 94 28 94 28 84 84	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 322 5 2195 32 32 43 322 137 131	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \end{array}$	Mii NewEv States 281 892 2899 21896 475835 406660 1095 37 32 5 37 32 37 32 37 32 37 32 121 121	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.13 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \end{array}$	Mi States 282 1241 5333 8098 986750 946799 1095 383 19223 5 3357 375 8347 12944 163 152	$\begin{array}{c} n \\ \hline {\rm Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.37 \\ 0.37 \end{array}$	Mi Transi States 281 1256 5333 17414 1391084 1352890 1145 196 322 105 123 32 91 322 160 112	$\begin{array}{c} n \\ \hline tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.19 \end{array}$	Or States 272 863 458 36406 265472 320888 2360 4790 95 5 2189 3344 13889 3287 260 260	$\begin{array}{c} {\rm Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37 32 99 99	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\ \hline \\$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave	Aut 31 67 35 84 84 65 80 28 14 88 28 94 28 88 48 84 88 48 4	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 322 5 2195 32 32 43 32 137 131 2791	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \end{array}$	Mii NewE- States 281 892 2899 21896 475835 4066600 1095 37 32 5 37 32 37 32 37 32 37 32 121 121	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.19 \end{array}$	Mii States 282 1241 533 8098 986750 946799 1095 383 19223 3357 375 8847 12944 1633 152 559	$\begin{array}{c} n \\ \hline {\rm Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.37 \\ 0.63 \end{array}$	Mi Transi States 281 1256 5333 17414 1391084 1352890 1145 196 322 105 123 32 105 123 32 105 123 32 160 0112 112	$\begin{array}{c} n \\ \hline \text{tions} \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.19 \\ 0.18 \end{array}$	Or States 272 863 458 36406 265472 320888 2360 4790 95 5 2189 3344 13889 3247 260 260 182	$\begin{array}{c} \hline \mathbf{Time} \\ 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \\ 0.28 \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37 32 37 32 99 99	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \textbf{Time} \\ \hline 0.14 \\ 0.26 \\ 0.1 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.68 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.17 \end{array}$
Model Name big.bmw fzelle rhone.alps tbed.ctct tbed.nocoll tbed.noderail verriegel4 profisafe.i4_host profisafe.i5_profisafe.i5_profisafe.i5_profisafe.i6_profisafe.i6_profisafe.i6_profisafe.i6_host profisafe.i6_host profisafe.inclusion_i4host profisafe.inclusion_o4slave profisafe.o4	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 78 84 84 90	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 32 5 2195 32 43 32 43 32 137 131 2791 37	$\begin{array}{c} n \\ ats \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.31 \\ 0.23 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \end{array}$	Mii NewE- States 281 892 2899 21896 475835 406660 1095 37 32 5 37 32 37 32 37 32 121 121 121 121 37	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.19 \\ 0.15 \end{array}$	Mii States 282 1241 533 8098 986750 946799 1095 383 19223 5 3357 375 8847 12944 163 152 559 189	$\begin{array}{c} n \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.37 \\ 0.63 \\ 0.39 \\ \end{array}$	Mi Transi States 281 1256 533 17414 1391084 1352890 1145 196 32 105 123 32 91 32 160 112 112 43	$\begin{array}{c} n \\ \hline \text{tions} \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.19 \\ 0.18 \\ 0.16 \\ \end{array}$	Or States 272 863 458 36406 265472 320888 2360 4790 95 5 2189 3344 13889 3287 260 260 260 2189	$\begin{array}{c} \hline \mathbf{Time} \\ 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.07 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.28 \\ 0.28 \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37 32 37 32 99 99 99 99	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \textbf{Time} \\ 0.14 \\ 0.26 \\ 0.13 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.03 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.15 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_bost profisafe_i4_slave profisafe_i5 profisafe_i5 profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4 profisafe_o4_host	Aut 31 67 35 84 84 84 65 80 28 14 88 28 94 28 94 28 84 84 84 90 30	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 32 5 2195 32 43 32 43 32 137 131 2791 37 32	$\begin{array}{c} n \\ ats \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \end{array}$	Mii NewE- States 281 892 2899 21896 475835 406660 1095 37 32 5 5 37 32 37 32 37 32 121 121 121 121 121 37 37 32	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.19 \\ 0.15 \\ 0.09 \end{array}$	Mii States 282 1241 533 8098 986750 946799 1095 383 19223 55 3357 375 8847 12944 163 152 559 189 120	$\begin{array}{c} n \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.63 \\ 0.39 \\ 0.23 \\ \end{array}$	Mi Transi States 281 1256 533 17414 1391084 1352890 1145 196 32 1005 123 32 91 32 160 112 112 112 112 43 32	$\begin{array}{c} n \\ \hline \text{tions} \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \end{array}$	Or States 272 863 458 36406 265472 320888 2360 4790 95 5 2189 3344 13889 3287 2600 2600 2600 1829 102	$\begin{array}{c} \hline \mathbf{Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.28 \\ 0.2 \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37 32 37 32 99 99 99 99 99 99	$\begin{array}{c} \text{fax} \\ \hline \text{non} \\ \hline \hline \text{Time} \\ 0.14 \\ 0.26 \\ 0.13 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.15 \\ 0.09 \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_noccoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_slave	Aut 31 67 35 84 84 84 84 85 80 28 14 88 28 94 28 94 28 94 28 94 88 88 88 88 88 88 94 88 88 88 88 88 88 88 88 88 8	Mi Even States 281 9666 458 30451 1594044 1345867 1036 96 32 5 2195 32 433 32 433 32 137 131 2791 37 32 5 5	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.22 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \\ 0.04 \end{array}$	Mii NewE- States 281 892 2899 21896 475835 406660 1095 377 32 5 377 32 37 32 37 32 121 121 121 121 37 32 5 5 5 5 37	$\begin{array}{c} n \\ \hline vents \\ \hline Time \\ 0.15 \\ 0.26 \\ 0.15 \\ 0.21 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.15 \\ 0.09 \\ 0.05 \end{array}$	Mi States 282 1241 5333 8098 986750 946799 1095 3883 19223 5 3357 375 8847 12944 163 152 559 189 189 200 5	$\begin{array}{c} n \\ \hline \text{res} \\ \hline \hline \text{Time} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.37 \\ 0.63 \\ 0.37 \\ 0.63 \\ 0.39 \\ 0.23 \\ 0.04 \end{array}$	Mi Transi States 281 12566 533 17414 1391084 1352890 1145 1966 322 105 123 32 91 322 160 112 112 43 322 160	$\begin{array}{c} n \\ tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \\ 0.06 \end{array}$	Or States 272 863 36406 265472 320888 23600 47900 95 5 2189 3344 13889 3287 2600 2600 1822 189 3267 2600 2600 1822 189 3267 2600 2500 2500 2000 2	$\begin{array}{c} \hline \mathbf{Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.2 \\ 0.05 \end{array}$	RelM Comr States 277 8922 278 6121 277491 275954 1095 37 32 5 37 32 37 32 37 32 99 99 99 99 99 37 32 5 5 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 32 37 32 32 32 32 32 32 32 32 32 32 32 32 32	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \text{Time} \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.09 \\ 0.04 \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_o4_host profisafe_o5_host	Aut 31 67 35 84 84 84 84 88 84 88 84 88 84 88 84 84	Mi Even States 281 966 4588 30451 1594044 1345867 1036 966 322 5 2195 32 43 322 137 131 2791 37 32 5 37	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.22 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \end{array}$	Mii NewEv States 281 892 2899 21896 475835 406660 1095 377 322 5 377 322 37 32 121 121 121 121 121 37 32 5 37	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.19 \\ 0.15 \\ 0.05 \\ 0.05 \\ 0.17 \end{array}$	Mii States 282 1241 5333 8098 986750 946799 1095 383 19223 3357 3357 3357 3357 3357 3357 12944 163 152 559 189 120 5 141	$\begin{array}{c} n \\ \hline {\rm res} \\ \hline {\rm Time} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.37 \\ 0.63 \\ 0.39 \\ 0.23 \\ 0.04 \\ 0.34 \\ 0.34 \end{array}$	Mi Transi States 281 1256 5333 17414 1391084 1352890 1145 196 322 105 123 32 91 322 160 112 112 43 32 111 43	$\begin{array}{c} n \\ tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.13 \\ 0.19 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \\ 0.06 \\ 0.18 \end{array}$	Or States 272 863 36406 265472 320888 2360 4790 95 5 2189 3344 13889 3287 260 260 182 189 102 5 187	$\begin{array}{c} \hline \mathbf{Time} \\ \hline 0.15 \\ 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.2 \\ 0.25 \\ 0.32 \\ \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37 32 37 32 99 99 99 99 99 99 37 32 5 37	$\begin{array}{c} \text{fax} \\ \underline{\text{non}} \\ \hline \hline \textbf{Time} \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 26.89 \\ 0.36 \\ 0.16 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.15 \\ 0.04 \\ 0.18 \\ \end{array}$
Model Name big.bmw fzelle rhone.alps tbed_ctct tbed_nocoll tbed_nocoll tbed_noderail verriegel4 profisafe.i4_host profisafe.i5_host profisafe.i5_host profisafe.i6_host profisafe.i6_host profisafe.i6_host profisafe.o4_host profisafe.o5_host	$\begin{array}{c} {\rm Aut}\\ 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 84\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ \end{array}$	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 322 5 2195 32 43 32 43 32 137 131 2791 37 37 37 32	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.1 \end{array}$	Mii NewE- States 281 892 2899 21896 475835 406660 1095 37 322 5 37 32 37 32 121 121 121 121 121 37 32 5 5 37 32 32 37 32 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 37 32 37 32 37 32 37 32 37 37 32 37 37 32 37 37 32 37 32 32 37 37 32 37 37 32 37 32 32 37 37 32 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 32 37 37 37 37 32 37 37 37 37 37 37 37 37 37 37 37 37 37	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.15 \\ 0.09 \\ 0.05 \\ 0.17 \\ 0.12 \end{array}$	Mii States 282 1241 5333 8098 986750 946799 1095 383 19223 5 3357 375 8847 12944 1633 152 559 189 1200 5 141	$\begin{array}{c} n \\ \hline {\rm res} \\ \hline {\rm Time} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.37 \\ 0.63 \\ 0.39 \\ 0.23 \\ 0.04 \\ 0.34 \\ 0.89 \end{array}$	Mi Transi States 281 1256 5333 17414 1391084 1352890 1145 196 322 105 123 32 160 112 32 160 112 112 43 32 111 43 32	$\begin{array}{c} n \\ \hline \text{tions} \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.13 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \\ 0.06 \\ 0.18 \\ 0.11 \end{array}$	$\begin{array}{c} \text{Or}\\ \hline\\ \text{States}\\ 272\\ 863\\ 458\\ 36406\\ 265472\\ 320888\\ 2360\\ 4790\\ 95\\ 5\\ 2189\\ 3344\\ 13889\\ 3287\\ 2600\\ 260\\ 182\\ 189\\ 102\\ 5\\ 187\\ 6512 \end{array}$	$\begin{array}{c} \hline \mathbf{Time} \\ 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.28 \\ 0.2 \\ 0.05 \\ 5.64 \end{array}$	$\begin{array}{c} {\rm RelM} \\ {\rm Comr} \\ {\rm States} \\ 277 \\ 892 \\ 278 \\ 6121 \\ 277491 \\ 275954 \\ 1095 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 37 \\ 32 \\ 99 \\ 99 \\ 99 \\ 99 \\ 99 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 37 \\ 32 \\ 5 \\ 37 \\ 32 \\ 37 \\ 37$	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \textbf{Time} \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.12 \end{array}$
Model Name big.bmw fzelle rhone.alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe.i4_bost profisafe.i4_slave profisafe.i5_ profisafe.i5_bost profisafe.i6_bost profisafe.i6_host profisafe.i6_host profisafe.i6_host profisafe.i6_host profisafe.o4_host profisafe.o5_profisafe.o5_profisafe.o5_profisafe.o5_profisafe.o5_profisafe.o6_profisafe.o6_profisafe.o6_profisafe.o6_profisafe.o5_profisafe.o5_profisafe.o6_profisafe.of_profisafe.o	$\begin{array}{c} {\rm Aut} \\ 31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 88 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 84 \\ 84 \\ 90 \\ 30 \\ 16 \\ 99 \\ 30 \\ 106 \end{array}$	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 322 5 2195 32 32 32 37 37 32 37 32 37	$\begin{array}{c} n \\ \hline nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.1 \\ 0.2 \end{array}$	Mii NewE- States 281 892 2899 21896 475835 4066600 1095 37 32 5 37 32 37 32 121 121 121 121 121 37 32 5 37 32 32 37 32 32 37 32 32 37	$\begin{array}{c} n \\ \hline {\rm vents} \\ \hline {\rm Time} \\ \hline 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.19 \\ 0.05 \\ 0.07 \\ 0.12 \\ 0.2 \\ 0$	Mii States 282 1241 533 8098 986750 946799 1095 383 19223 3357 375 8847 12944 163 152 559 189 120 5 54 141 387 131	$\begin{array}{c} n \\ \hline {\rm res} \\ \hline {\rm Time} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.63 \\ 0.37 \\ 0.63 \\ 0.39 \\ 0.23 \\ 0.04 \\ 0.38 \\ 0.4 \\ 0.89 \\ 0.4 \end{array}$	Mi Transi States 281 1256 5333 17414 1391084 1352890 1145 196 322 105 123 32 105 123 32 105 123 32 105 123 32 105 123 32 1600 112 112 43 32 43	$\begin{array}{c} n \\ \hline \text{tions} \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \\ 0.06 \\ 0.18 \\ 0.11 \\ 0.21 \\ \end{array}$	$\begin{array}{c} \text{Or}\\ \hline\\ \text{States}\\ 272\\ 863\\ 458\\ 36406\\ 265472\\ 320888\\ 2360\\ 4790\\ 955\\ 2189\\ 3344\\ 13889\\ 3287\\ 2600\\ 2600\\ 2600\\ 282\\ 189\\ 102\\ 5\\ 187\\ 617\\ 121\\ 2124 \end{array}$	$\begin{array}{c} \hline \mathbf{Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.22 \\ 0.05 \\ 0.32 \\ 5.64 \\ 0.37 \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37 32 99 99 99 99 99 37 32 5 5 37 32 37 37 32 37 37 37 32 37 37 37 32 37 37 37 32 37 37 37 32 37 37 37 37 37 37 37 37 37 37 37 37 37	$\begin{array}{c} \text{fax} \\ \hline \text{non} \\ \hline \hline \text{Time} \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.03 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.12 \\ 0.2 \end{array}$
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host	$\begin{array}{c} {\rm Aut} \\ 31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 88 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 94 \\ 28 \\ 84 \\ 84 \\ 90 \\ 30 \\ 16 \\ 99 \\ 30 \\ 106 \\ 30 \\ \end{array}$	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 32 5 2195 32 43 32 43 32 137 131 2791 37 32 5 37 32 37 32	$\begin{array}{c} n \\ \hline n \\ mats \\ \hline \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.2 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.11 \\ 0.2 \\ 0.13 \end{array}$	Mii NewE- States 281 892 2899 475835 406660 1095 37 32 5 37 32 37 32 121 121 121 121 121 37 32 37 37 32 37 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 32 37 32 37 37 37 37 32 37 37 37 37 37 37 37 37 37 37 37 37 37	$\begin{array}{c} n \\ \hline \text{vents} \\ \hline \hline \text{Time} \\ 0.15 \\ 0.26 \\ 0.12 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.09 \\ 0.05 \\ 0.017 \\ 0.12 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.13 \end{array}$	Mii States 282 1241 533 8098 986750 946799 1095 383 19223 5 3357 375 8847 12944 163 1529 189 120 5 5 141 387 131 1168	$\begin{array}{c} n \\ \hline {\rm Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.63 \\ 0.39 \\ 0.23 \\ 0.04 \\ 0.39 \\ 0.23 \\ 0.04 \\ 0.34 \\ 0.89 \\ 0.4 \\ 9.71 \end{array}$	Mi Transi States 281 1256 533 17414 1391084 1352890 1145 196 32 105 123 32 91 32 160 112 112 112 43 32 160 112 112 43 32 43 32 32 32 32 32 32 32 32 32 32 32 32 32	$\begin{array}{c} n \\ \hline \text{tions} \\ \hline \text{Time} \\ \hline 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \\ 0.06 \\ 0.18 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.21 \\ 0.13 \\ 0.21 \\ 0.13 \\ 0.21 \\ 0.$	Or States 272 863 458 36406 265472 320888 2360 4790 955 2189 3344 13889 3287 2600 2600 2600 1822 189 102 5 187 6512 124 277 272 124 277 272 124 277 277 272 272 272 272 272 2	$\begin{array}{c} \hline \mathbf{Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.28 \\ 0.28 \\ 0.28 \\ 0.28 \\ 0.28 \\ 0.28 \\ 0.28 \\ 0.28 \\ 0.37 \\ 0.39 \\ \end{array}$	RelM Comr States 277 892 278 6121 277491 275954 1095 37 32 5 37 32 37 32 37 32 99 99 99 99 99 99 37 32 37 37 32 37 37 37 32 37 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 37 37 32 37 37 37 32 37 37 37 37 37 37 37 37 37 37 37 37 37	$\begin{array}{c} \text{fax} \\ \text{non} \\ \hline \textbf{Time} \\ 0.14 \\ 0.26 \\ 0.13 \\ 0.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.03 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.12 \\ 0.2 \\ 0.2 \\ 0.12 \\ 0.12 \end{array}$
Model Name big_bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_bost profisafe_i5_bost profisafe_i5_bost profisafe_i6_bost profisafe_i6_bost profisafe_i6_bost profisafe_o4_bost profisafe_o4_bost profisafe_o5_bost profisafe_o5_bost profisafe_o6_bost ftechnik	$\begin{array}{c} {\rm Aut} \\ 31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 84 \\ 90 \\ 30 \\ 16 \\ 99 \\ 30 \\ 106 \\ 30 \\ 106 \\ 30 \\ \end{array}$	Mi Even States 281 9666 458 30451 1594044 1345867 1036 96 32 5 2195 32 43 32 137 131 2791 37 32 5 37 32 37 32 37 32 37	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.22 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.11 \\ 0.22 \\ 0.23 \\ 0.43 \\ 0.13 \\ 0.43 \\ 0.14 \\ 0.13 \\ 0.22 \\ 0.13 \\ 0.43 \\ 0.11 \\ 0.22 \\ 0.13 \\ 0.13 \\ 0.24 \\ 0.13 \\ 0.25 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.11 \\ 0.22 \\ 0.13 \\ 0.13 \\ 0.25 \\ 0.09 \\ 0.04 \\ 0.14 \\ $	Mii NewE- States 281 892 21896 475835 406660 1095 37 32 5 37 32 37 32 121 121 121 121 121 121 32 5 37 32 37 32 37 32 37 32 37 32 37 32 37 32 5 5 37 32 32 37 32 32 37 32 32 37 32 32 37 32 32 37 32 37 32 32 37 32 32 37 32 32 37 32 32 37 32 32 37 32 37 32 32 37 32 32 37 32 32 37 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 32 37 37 32 32 37 37 32 32 37 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 37 32 37 32 37 32 37 32 37 37 32 32 37 37 32 32 37 37 37 37 32 37 37 37 37 37 37 37 37 32 37 37 37 37 37 32 37 37 37 37 37 37 37 37 37 37 37 37 37	$\begin{array}{c} n \\ \hline vents \\ \hline Time \\ 0.15 \\ 0.26 \\ 0.15 \\ 0.21 \\ 4.42 \\ 54.75 \\ 41.7 \\ 0.36 \\ 0.13 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.13 \\ 0.17 \\ 0.19 \\ 0.15 \\ 0.09 \\ 0.05 \\ 0.17 \\ 0.12 \\ 0.22 \\ 0.13 \\ 2.85 \end{array}$	Mii States 282 1241 5333 8098 986750 946799 1095 3883 19223 5 3357 375 8847 12944 163 152 559 1894 1200 5 141 387 131 11688 10760	$\begin{array}{c} n \\ \hline res \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.37 \\ 0.63 \\ 0.37 \\ 0.63 \\ 0.37 \\ 0.63 \\ 0.37 \\ 0.63 \\ 0.37 \\ 0.63 \\ 0.4 \\ 0.34 \\ 0.89 \\ 0.4 \\ 9.71 \\ 5.23 \end{array}$	Mi Transi States 281 12566 533 17414 1391084 1352890 1145 1966 322 105 123 32 105 123 32 160 112 112 112 43 32 32 160 112 112 43 32 32 5878	$\begin{array}{c} n \\ tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.24 \\ 0.09 \\ 0.07 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \\ 0.06 \\ 0.18 \\ 0.11 \\ 0.21 \\ 0.21 \\ 0.33 \\ 3.92 \end{array}$	Or States 272 36406 265472 320888 23600 47900 95 5 2189 3344 13889 3287 2600 2600 1822 189 1022 5 187 6512 1244 277 6513	$\begin{array}{c} \hline \mathbf{Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.2 \\ 0.05 \\ 0.32 \\ 5.64 \\ 0.37 \\ 0.39 \\ 2.88 \end{array}$	RelM Comr States 277 8922 278 6121 277491 275954 10955 37 32 5 37 32 37 32 99 99 99 99 99 99 99 99 37 32 5 37 32 37 32 37 32 5 37 32 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 5 37 32 37 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 37 32 37 32 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 32 37 37 37 32 37 37 32 337 37 32 337 37 32 337 37 32 337 37 32 337 37 32 337 37 32 337 37 37 32 337 37 32 337 37 32 337 37 32 337 32 337 32 337 337	$\begin{array}{c} \text{fax} \\ \hline \text{non} \\ \hline \hline \text{Time} \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 0.09 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.16 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.12 \\ 0.2 $
Model Name big.bmw fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host	$\begin{array}{c} {\rm Aut} \\ 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 84\\ 84\\ 88\\ 14\\ 88\\ 28\\ 94\\ 28\\ 84\\ 84\\ 84\\ 90\\ 300\\ 106\\ 60\\ 300\\ 36\\ 61\\ \end{array}$	Mi Even States 281 966 458 30451 1594044 1345867 1036 96 32 5 2195 32 43 32 43 32 137 131 2791 37 32 5 37 32 37 32	$\begin{array}{c} n \\ nts \\ \hline Time \\ 0.15 \\ 0.28 \\ 0.16 \\ 6.37 \\ 236.95 \\ 191.09 \\ 0.31 \\ 0.22 \\ 0.09 \\ 0.03 \\ 1.38 \\ 0.11 \\ 0.19 \\ 0.13 \\ 0.22 \\ 0.23 \\ 0.89 \\ 0.15 \\ 0.09 \\ 0.04 \\ 0.18 \\ 0.1 \\ 0.2 \\ 0.04 \\ 0.18 \\ 0.1 \\ 0.2 \\ 0.33 \\ 10.92 \end{array}$	Mii NewE- States 281 892 2899 475835 406660 1095 37 32 5 37 32 37 32 121 121 121 121 121 37 32 37 37 32 37 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 32 37 32 37 37 37 37 32 37 37 37 37 37 37 37 37 37 37 37 37 37	$\begin{array}{c} n \\ \hline vents \\ \hline Time \\ 0.15 \\ 0.26 \\ 0.15 \\ 0.26 \\ 0.15 \\ 0.26 \\ 0.13 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.03 \\ 0.16 \\ 0.11 \\ 0.17 \\ 0.19 \\ 0.19 \\ 0.19 \\ 0.15 \\ 0.09 \\ 0.05 \\ 0.17 \\ 0.12 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.48 \\ 0.9 \\$	Mii States 282 1241 5333 8098 986750 946799 1095 3883 19223 5 3357 375 8847 12944 163 152 559 1894 1200 5 141 387 131 11688 10760	$\begin{array}{c} n \\ \hline {\rm res} \\ \hline {\rm Time} \\ 0.14 \\ 0.37 \\ 0.21 \\ 5.08 \\ 115.62 \\ 119.49 \\ 0.36 \\ 1.05 \\ 29.53 \\ 0.03 \\ 5.76 \\ 1.01 \\ 58.03 \\ 8.26 \\ 0.37 \\ 0.63 \\ 0.37 \\ 0.63 \\ 0.39 \\ 0.23 \\ 0.04 \\ 0.34 \\ 0.89 \\ 0.4 \\ 9.71 \\ \hline 5.23 \\ 11.98 \end{array}$	Mi Transi States 281 1256 533 17414 1391084 1352890 1145 1966 322 105 123 32 91 322 160 112 112 43 322 111 43 322 5878	$\begin{array}{c} n \\ tions \\ \hline Time \\ 0.14 \\ 0.37 \\ 0.21 \\ 4.83 \\ 185.36 \\ 184.28 \\ 0.41 \\ 0.22 \\ 0.11 \\ 0.22 \\ 0.11 \\ 0.21 \\ 0.13 \\ 0.19 \\ 0.19 \\ 0.18 \\ 0.16 \\ 0.09 \\ 0.06 \\ 0.18 \\ 0.11 \\ 0.21 \\ 0.39 \\ 0.95 \\ 9.5 \\ 9.5 \end{array}$	Or States 272 863 36406 265472 320888 23600 4790 95 5 2189 3344 13889 3287 260 2600 182 189 1022 5 187 6512 124 277 6513 397758	$\begin{array}{c} \hline \mathbf{Time} \\ \hline 0.15 \\ 0.24 \\ 0.16 \\ 6.94 \\ 50.43 \\ 55.1 \\ 1.4 \\ 40.72 \\ 0.17 \\ 0.03 \\ 1.5 \\ 7.23 \\ 23.67 \\ 11.29 \\ 0.43 \\ 0.47 \\ 0.28 \\ 0.28 \\ 0.28 \\ 0.25 \\ 0.32 \\ 5.64 \\ 0.37 \\ 0.38 \\ 8.68 \\ 8.68 \end{array}$	RelM Comr States 277 8922 278 6121 277491 275954 10955 37 32 5 37 32 37 32 99 99 99 99 99 99 99 99 37 32 5 37 32 37 32 37 32 5 37 32 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 37 32 5 5 5 37 32 37 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 32 37 37 32 37 32 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 32 37 37 37 32 37 37 32 37 37 32 337 37 32 37 37 32 37 37 32 37 37 32 37 37 32 37 37 37 32 37 37 37 32 37 37 37 32 37 37 32 37 37 32 37 37 32 37 37 32 337 37 32 337 37 32 337 37 32 337 337	$\begin{array}{c} \text{fax} \\ \hline \text{non} \\ \hline \hline \text{Time} \\ 0.14 \\ 0.26 \\ 0.11 \\ 1.63 \\ 33.13 \\ 26.89 \\ 0.36 \\ 0.13 \\ 26.89 \\ 0.36 \\ 0.16 \\ 0.11 \\ 0.18 \\ 0.13 \\ 0.16 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.17 \\ 0.16 \\ 0.10 \\ 0.14 \\ 0.12 \\ 0.2 \\ 0.2 \\ 0.2 \\ 0.26 \\ 10.85 \\ \end{array}$

Table 6.4
MODULAR PROJECTING CONTROLLABILITY, EXHAUSTIVE, MAX
PROJECTION 1000

Model				Modular	projectii	ng control	lability	, exhaustiv	ve, max	projectior	1000		
		Al	1	Ear	·ly	Lat	e	MaxCo	mmon	MaxCor	nmon	Max	x
				NotAe	ccept	NotAc		Ever	nts	Unco	$\operatorname{ntr}$	State	es
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	31528	0.4	13431	0.19	16391	0.18	14432	0.18	14418	0.16	16391	0.18
fzelle	67	9935	0.27	1655	0.22	633	0.23	2869	0.25	3850	0.25	3557	0.22
rhone_alps	35	17865	0.26	66143	0.61	24700	0.3	10424	0.19	19784	0.33	23602	0.29
tbed_ctct	84	74419	1.42	33509	0.53	2516207	43.54	27390	0.46	38924	0.96	604457	10.24
tbed_nocoll	84	2656809	114.09	16546885	1103.35	16604262	664.74	1934572	35.78	7445386	343.62	8707170	420.07
tbed_noderail	84	2117338	59.27	17559141	1368.08	12670069	645.38	2425961	82.5	7250563	340.16	11088228	617.63
verriegel4	65	67574	0.67	231228	1.94	29860	0.84	32982	0.87	186632	1.98	281829	2.97
profisafe_i4	80	6571	0.56	41764	0.9	10429	0.52	45	0.14	18781	0.95	45	0.13
profisafe_i4_host	28	3171	0.23	62785	0.82	9403	0.54	40	0.1	4234	0.29	40	0.1
profisafe_i4_slave	14	8	0.04	2100	0.09	5	0.03	5	0.03	5	0.03	5	0.03
profisafe_i5	88	8588	0.72	76781	1.35	10429	0.61	45	0.16	8420	0.58	45	0.16
profisafe_i5_host	28	5192	0.41	75878	1.11	17537	0.87	40	0.12	34041	1.88	40	0.12
profisafe_i6	94	9612	1.06	58858	1.11	10419	0.7	45	0.18	21796	1.6	45	0.18
profisafe_i6_host	28	9604	1.1	58785	1.07	3133	0.23	40	0.13	21791	1.73	40	0.13
profisafe_inclusion_i4host	78	5217	0.22	1212	0.22	51	0.12	51	0.12	11181	0.28	79	0.14
profisafe_inclusion_o4host	84	5217	0.23	23609	0.52	51	0.13	51	0.13	15402	0.46	8259	0.3
$profisafe\_inclusion\_o4slave$	84	7342	0.34	37875	0.7	51	0.13	51	0.13	11181	0.3	125706	0.99
profisafe_04	90	5214	0.37	59821	0.9	14726	1.01	45	0.15	75715	3.29	45	0.15
profisafe_o4_host	30	4148	0.24	12386	0.35	9398	0.55	40	0.1	5475	0.46	40	0.1
profisafe_o4_slave	16	8	0.05	73	0.09	5	0.05	5	0.04	5	0.05	5	0.04
profisafe_05	99	8588	0.96	41498	0.78	18536	0.86	45	0.18	55460	14.9	45	0.18
profisafe_o5_host	30	8580	0.74	44531	0.95	24327	0.96	40	0.12	38992	1.92	40	0.12
profisafe_06	106	7194	0.52	73978	1.36	4239	0.45	45	0.2	28497	0.95	45	0.21
profisafe_06_host	- 30	5192	0.31	1305	0.45	10424	0.94	40	0.13	10424	0.7	40	0.13
ftechnik	36	335976	8.13	321765	4.4	396638	11.69	429044	11.23	251360	4.85	563667	21.86
rhone_tough	61	638699	21.89		34.11	1107071	37.12	746546	23.95	1108472	43.27		8.75
tbed_uncont	84	2229655		12049242		9601683		4091566	171.08	4489598		5984090	
Model		Mi		Mi		Min		Mi		On	e	RelM	
3.7	<b>A</b> .	Eve		NewE		Stat		Transi				Comm	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	12420	0.15	12420	0.15	16427	0.16	12420	0.15	14432	0.15	14436	0.17
fzelle	67	1973		1869	0.26	2362	0.36	3375	0.36	3850	0.24	1869	0.26
rhone_alps	35	9704	0.18	3508	0.15	17848	0.24	17848	0.24	6669	0.16	2477	0.14
tbed_ctct	84	3034759	70.64	1564168	46.64	465969	4.79	3189913	62.43		58.01	261723	3.36
tbed_nocoll	84	30622807		9761331					1271.89	9972105	356.81	6703498	
tbed_noderail	84	24161489		10716432				26328158			626.69	4546061	
verriegel4	65	60039	0.83	26979	0.79	72157	0.92	41864	0.78	186632	2.08	26979	0.79
profisafe_i4	80	5347	0.34	45	0.13	10440	0.54	5233	0.26	18781	0.96	45	0.13
profisafe_i4_host	28	2058	0.12	2058	0.11	27713	1.08	2058	0.12	4234	0.29	2058	0.12
profisafe_i4_slave	14	14000	0.03	5	0.03	10454	0.03	2100	0.09	5	0.03	5	0.03
profisafe_i5	88	14600	0.98	45	0.16	10454	0.68	3206	0.28	8420	0.56	45	0.16
profisafe_i5_host	28	7128	0.24	7128	0.24	17548	0.89	2058	0.14	34041	1.84	2058	0.15
profisafe_i6	94	6257 7126	0.59	2063	0.21	18567	1.06	2131	0.25	21796	1.61	2063	0.21
profisafe_i6_host	28	7136	0.29	2058	0.16	3144	0.25	2058	0.16	21791	1.7	2058	0.16
profisafe_inclusion_i4host	78	7309	0.33	8282	0.3	13286	0.36	4147	0.19	10263	0.31	6158	0.21
profisafe_inclusion_o4host	84	7302	0.34	8282	0.32	14394	0.49	5247	0.28	14511	0.52	6158	0.23
profisafe_inclusion_o4slave	84 90	7309	0.35	8282	0.32	13478	0.53 1.02	4251	0.28	10263	0.33	6158 45	0.24
profisafe_o4		3051	0.2	45	0.15	14737			0.16	75715	3.28		0.15
profisafe_o4_host	30 16	2063 5		40 5		5482 5			0.1 0.06		1.91 0.05	40 5	
profisafe_o4_slave profisafe_o5	16 99	6240				о 10430				55460	0.05	э 2063	
profisafe_05_host	99 30	6240 40		2063	0.21	10430	0.64	2070 40		38992	15.06	2063	0.2
profisafe_05_nost profisafe_06	30 106	40 45		40 45							0.93		
profisafe_06_host	30	45 40			0.2		0.46	52 40			0.93	45 40	
ftechnik	30	296140		40 242536	8.44	10435 436762	7.29	40 374514		254631	4.15	211651	0.13 5.18
		296140 993382				450702	11.44		7.1 9.67			736023	
rhone_tough tbed_uncont	61 84	993382 15641854				0264324		15294820					
uncont	04	10041004	010.92	9100200	400.90	9204324	911.08	10294020	003.00	0004064	104.03	01040/1	400.07

Name         Au         Early         Late         Ture         State         State </th <th>Model</th> <th></th> <th>Modular</th> <th>contr</th> <th colspan="2">rollability using n</th> <th>non-exh</th> <th>austiv</th> <th>ve proje</th> <th>ection a</th> <th>as pre-pro</th> <th>ocess,</th> <th>max pro</th> <th>jection 1000</th>	Model		Modular	contr	rollability using n		non-exh	austiv	ve proje	ection a	as pre-pro	ocess,	max pro	jection 1000
$\begin{split} \hline   \begin box  \begin box$			All	ļ										
big_lmw 31 287 0.29 287 0.17 287 0.16 287 0.2 287 0.16 287 0.16 0.57 feel and the set of the set o														
facilite         67         965         0.53         965         0.64         965         0.63         965         0.56         965         0.63           thomc.alps         35         236         0.16         236         0.16         236         0.16         236         0.16         236         0.16         236         0.16         236         0.16         236         0.16         236         0.16         236         0.16         17.58         thode.nocload         84         39596         4.14         49670         12.06         68.14         356.07         0.54         482816         0.16         147.58         48.78         vorringel4         63         1141         6.1         14.61         14.11         6.1         14.11         6.3         1414         6.3         1414         6.3         1414         6.3         1413         6.56         1413         6.56         1413         6.56         1413         6.56         1413         6.56         1413         6.51         1433         8.56         1433         8.56         1433         8.56         1433         8.56         1433         8.56         1433         8.56         1433         8.56         1433         150.56														
chone.alps         35         2.36         0.16         2.36         0.16         2.36         0.16         2.36         0.16         2.36         0.16         2.36         0.16         2.36         0.16         2.36         0.16         2.36         0.16         2.36         0.16         2.37         1.37.8           thed.nocen1         84         395986         4.11         40670         0.88         2162         0.86         2162         0.86         2162         0.86         2162         0.86         2162         0.86         4563         4.564         4.563         5.6         4504         3.65         4.504         3.65         4.504         3.65         4.504         3.65         4.504         3.65         4.504         3.65         4.504         3.65         7.78         7.555         7.78         7.555         7.78         7.55         7.78         7.78         7.55         7.73         7.55         7.417         7.855         7.417         7.855         7.417         7.855         7.417         7.855         7.417         7.855         7.417         7.855         7.417         7.855         7.417         7.855         7.417         7.855         7.417         7.855         7.														
thed_ncci thed_nocal set 3     309600     5.77     45402     10.4     452     452     452     452     454     455     45     455     45     455     45     455     45														
thed_nocall 84 30960 5.07 405402 12.64 4503 42.56 11.60 40.710 12.50 Bar{Bar{Bar{Bar{Bar{Bar{Bar{Bar{Bar{							236						236	
thed_moderail         84         35586         4.41         49670         10.96         68.14         35687         9.54         42821         0.102         0.482           verriegel4         50         2162         0.88         2162         0.88         2162         0.86         2162         0.86         2162         0.86         2162         0.86         2162         0.86         2162         0.96         2162         0.88         2163         6.6         1141         6.61         1141         6.13         8.66         1143         6.66         1141         6.33         8.61         1336         8.71         1206         9.61         9.61         9.61         9.61         9.61         9.61<														
verriegel4         65         1122         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2162         0.80         2163         0.85         1431         6.56         4101         6.50         6.70         0.85         0.70         0.05         0.70         0.05         0.70         0.05         0.70         0.05         0.78         0.05         0.78         0.50         0.78         0.55         0.78         0.55         0.78		-												
profisafe.jd.host         80         1452         4.50         4.57.31         4.504         3.67         4458         3.56         4458         3.56         4458         3.56         4458         3.56         4458         3.56         4458         5.48         6.61         1.16         6.61         1.005         0.78         1.015         77         1.005         1.017         0.016         0.11         0.125         0.13         1.015         1.015         0.133         3.61         0.135         0.135         0.135         0.135         0.135         0.135         0.135         0.135         0.135         0.135         0.135         0.135							2162							
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$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	*				1141									
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$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	profisafe_i5_host				1433									
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	*													
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	profisafe_i6_host	28		8.62	1296	8.63	1296	8.71	1296	9.06		8.76		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	profisafe_inclusion_i4host	78	4539	2.96		24.71	4259	3.02	4277	2.96	4329	2.76	5038	3.43
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	profisafe_inclusion_o4host	84	4548	2.39		77.8	3565	2.19	3816	2.44	3868	2.25	6485	2.97
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	profisafe_inclusion_o4slave	84	4093	2.09		68.23	3562	2.2	3813	2.4	3834	2.22	4955	2.45
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	1											3.83	4815	
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$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			5824		4170		6677		8167		5051			
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$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Model										One			
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fzelle       67       965       0.64       965       0.63       965       0.62       965       0.63       965       0.63         rhone,alps       35       236       0.16       237       37247       8.21         veriegel4       0.65       2162       0.92       2162       0.84       1.23       7631       6.54       1276       4441       3.57       4441       5.5       1141       5.99       1141       5.99       1141       5.99       1141       5.99<	rame	A 111	States	Time	States	Time	States	Time	States	Time	States	Time	States	
rhone_alps         35         236         0.16         236         242         2424         26790         4.2         769310         6.54         31274         33747         821           profisafe_14_host         28         1441         5.92         1041         5.99         1141         5.99         1141         5.99         1141         5.95         1141         5.95         1145         5.99         1143         8.61         1145         5.91	big bmw													Time
tbed_tct8427.3414.3825.2521.3818.0910.23tbed_nocoll8486.0680377714.442638915.2442016.3982.173372478.21tbed_noderail84351936129.6288850812.342667904.27693106.54312784030.933546937.28verriegel46521620.9221620.9421620.8921620.8621620.8621620.862162profisafe i48044403.5644403.5744413.5744413.5544403.57profisafe i4_slave1410050.810050.9410050.8210050.9510050.8110050.95profisafe i5_host2814338.5914338.5114338.6114338.4714338.6214338.43profisafe i69432113.6232113.5932343.7832663.6532363.8632113.63profisafe inclusion 4host7843073.2842722.8814388.7914812.2864.394.272.88profisafe inclusion 4host8443062.0842722.8814853.7543403.3543543.6943393.35profisafe inclusion 4host8443032.2842692.07148882.49148		31	287	0.2	287	0.15	287	0.15	287	0.2	287	0.14	287	Time 0.15
tbed_noderail84351936129.6288850812.342667904.27693106.54312784030.933546937.28verriegel46521620.9221620.9421620.8921620.8621620.8621620.8621620.87profisafe i48044403.5644403.5744415.5744413.5544413.5544403.57profisafe i4_slave1410050.811015.0911415.9911415.9911415.951.1050.8110050.95profisafe i58850366.1250366.3650376.3250376.1350376.350366.31profisafe i58850366.1250366.3612388.6114338.4714338.6214338.43profisafe i69432113.6232113.5932343.7832663.25632363.8632113.63profisafe inclusion i4host7843073.2842722.8842483.1242483.1242482.8672.2242722.89profisafe inclusion o4hate8443032.2842692.0714883.154.354.433.694.3393.354.354.3543.694.3933.35profisafe o4 lost043393.5843393.57 <td< td=""><td>fzelle</td><td>31 67</td><td>287 965</td><td><math>0.2 \\ 0.64</math></td><td>287 965</td><td>0.15 0.63</td><td>287 965</td><td><math>0.15 \\ 0.55</math></td><td>287 965</td><td>0.2 0.62</td><td>287 965</td><td><math>0.14 \\ 0.63</math></td><td>287 965</td><td>Time 0.15 0.63</td></td<>	fzelle	31 67	287 965	$0.2 \\ 0.64$	287 965	0.15 0.63	287 965	$0.15 \\ 0.55$	287 965	0.2 0.62	287 965	$0.14 \\ 0.63$	287 965	Time 0.15 0.63
verriegel46521620.9221620.9421620.8921620.8621620.8621620.8621620.8621620.8621620.87profisafe i48044403.5644403.5744413.5744413.5544413.5544403.57profisafe i4slave1410050.810050.9410050.8210050.9510050.8110050.95profisafe i58850366.1250366.3650376.3250376.1350376.350366.31profisafe i5host2814338.5914338.514338.6114338.4714338.6214338.43profisafe i69432113.6232113.5932343.7832663.6532363.8632113.63profisafe inclusion i4host7843073.2842722.8842483.1242482.8672.2242722.89profisafe inclusion o4host8443032.2842692.0714882.4914812.5943393.35profisafe o49043393.5843393.3743543.5543403.3543543.6943393.35profisafe o49043393.5843393.3743543.510.463510.463510.46 </td <td>fzelle rhone_alps</td> <td>31 67 35</td> <td>287 965</td> <td><math>0.2 \\ 0.64 \\ 0.16</math></td> <td>287 965</td> <td>0.15 0.63 0.16</td> <td>287 965</td> <td><math>\begin{array}{c} 0.15 \\ 0.55 \\ 0.16 \end{array}</math></td> <td>287 965</td> <td>0.2 0.62 0.16</td> <td>287 965</td> <td><math>0.14 \\ 0.63 \\ 0.16</math></td> <td>287 965 236</td> <td>Time 0.15 0.63 0.16</td>	fzelle rhone_alps	31 67 35	287 965	$0.2 \\ 0.64 \\ 0.16$	287 965	0.15 0.63 0.16	287 965	$\begin{array}{c} 0.15 \\ 0.55 \\ 0.16 \end{array}$	287 965	0.2 0.62 0.16	287 965	$0.14 \\ 0.63 \\ 0.16$	287 965 236	Time 0.15 0.63 0.16
profisafe i4804440 $3.56$ 4440 $3.57$ 4441 $3.57$ 4441 $3.55$ 4441 $3.55$ 4441 $3.55$ 4441 $3.55$ 4441 $3.55$ 4441 $3.57$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $4441$ $3.55$ $1441$ $5.99$ $1141$	fzelle rhone_alps tbed_ctct	31 67 35 84	287 965	$0.2 \\ 0.64 \\ 0.16 \\ 27.34$	287 965 236	0.15 0.63 0.16 14.38	287 965 236	$\begin{array}{c} 0.15 \\ 0.55 \\ 0.16 \\ 25.25 \end{array}$	287 965 236	$0.2 \\ 0.62 \\ 0.16 \\ 21.38$	287 965	$0.14 \\ 0.63 \\ 0.16 \\ 18.09$	287 965 236	Time 0.15 0.63 0.16 10.23
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll	31 67 35 84 84	287 965 236	$0.2 \\ 0.64 \\ 0.16 \\ 27.34 \\ 86.06$	287 965 236 803777	$0.15 \\ 0.63 \\ 0.16 \\ 14.38 \\ 14.44$	287 965 236 263891	$0.15 \\ 0.55 \\ 0.16 \\ 25.25 \\ 5.2$	287 965 236 442041	$\begin{array}{r} 0.2 \\ 0.62 \\ 0.16 \\ 21.38 \\ 6.39 \end{array}$	287 965 236	$0.14 \\ 0.63 \\ 0.16 \\ 18.09 \\ 82.17$	287 965 236 337247	$\frac{\text{Time}}{\begin{array}{c} 0.15 \\ 0.63 \\ 0.16 \\ 10.23 \\ 8.21 \end{array}}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail	31 67 35 84 84 84	287 965 236 3519361	$0.2 \\ 0.64 \\ 0.16 \\ 27.34 \\ 86.06 \\ 29.62$	287 965 236 803777 888508	$\begin{array}{r} 0.15 \\ 0.63 \\ 0.16 \\ 14.38 \\ 14.44 \\ 12.34 \end{array}$	287 965 236 263891 266790	$0.15 \\ 0.55 \\ 0.16 \\ 25.25 \\ 5.2 \\ 4.2$	287 965 236 442041 769310	$\begin{array}{c} 0.2 \\ 0.62 \\ 0.16 \\ 21.38 \\ 6.39 \\ 6.54 \end{array}$	287 965 236 3127840	0.14 0.63 0.16 18.09 82.17 30.93	287 965 236 337247 354693	Time 0.15 0.63 0.16 10.23 8.21 7.28
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4	31 67 35 84 84 84 65	287 965 236 3519361 2162	$\begin{array}{r} 0.2 \\ 0.64 \\ 0.16 \\ 27.34 \\ 86.06 \\ 29.62 \\ 0.92 \end{array}$	287 965 236 803777 888508 2162	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94 \end{array}$	287 965 236 263891 266790 2162	0.15 0.55 0.16 25.25 5.2 4.2 0.89	287 965 236 442041 769310 2162	$\begin{array}{c} 0.2 \\ 0.62 \\ 0.16 \\ 21.38 \\ 6.39 \\ 6.54 \\ 0.86 \end{array}$	287 965 236 3127840 2162	$0.14 \\ 0.63 \\ 0.16 \\ 18.09 \\ 82.17 \\ 30.93 \\ 0.86$	287 965 236 337247 354693 2162	Time 0.15 0.63 0.16 10.23 8.21 7.28 0.87
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80$	287 965 236 3519361 2162 4440	$\begin{array}{r} 0.2 \\ 0.64 \\ 0.16 \\ 27.34 \\ 86.06 \\ 29.62 \\ 0.92 \\ 3.56 \end{array}$	287 965 236 803777 888508 2162 4440	$\begin{array}{r} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57 \end{array}$	287 965 236 263891 266790 2162 4441 1141	$\begin{array}{r} 0.15 \\ 0.55 \\ 0.16 \\ 25.25 \\ 5.2 \\ 4.2 \\ 0.89 \\ 3.57 \\ 5.99 \end{array}$	$287 \\965 \\236 \\442041 \\769310 \\2162 \\4441$	$\begin{array}{c} 0.2 \\ 0.62 \\ 0.16 \\ 21.38 \\ 6.39 \\ 6.54 \\ 0.86 \\ 3.55 \end{array}$	287 965 236 3127840 2162 4441	$\begin{array}{c} 0.14 \\ 0.63 \\ 0.16 \\ 18.09 \\ 82.17 \\ 30.93 \\ 0.86 \\ 3.55 \end{array}$	287 965 236 337247 354693 2162 4440	$\frac{\text{Time}}{\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 10.23\\ 8.21\\ 7.28\\ 0.87\\ 3.57 \end{array}}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocell tbed_noderail verriegel4 profisafe_i4_host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14$	287 965 236 3519361 2162 4440 1141	$\begin{array}{r} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93 \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94 \end{array}$	287 965 236 263891 266790 2162 4441 1141 1005	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82 \end{array}$	2879652364420417693102162444111411005	$\begin{array}{c} 0.2 \\ 0.62 \\ 0.16 \\ 21.38 \\ 6.39 \\ 6.54 \\ 0.86 \\ 3.55 \\ 5.99 \end{array}$	287 965 236 3127840 2162 4441 1141	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ \end{array}$	$\frac{\text{Time}}{0.15}\\0.63\\0.16\\10.23\\8.21\\7.28\\0.87\\3.57\\5.93$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave profisafe_i5	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88$	287965236 $351936121624440114110055036$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12 \end{array}$	$\begin{array}{c} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\end{array}$	28796523626389126679021624441114110055037	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\end{array}$	28796523644204176931021624441114110055037	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\end{array}$	$\begin{array}{c} \hline \text{Time} \\ 0.15 \\ 0.63 \\ 0.16 \\ 10.23 \\ 8.21 \\ 7.28 \\ 0.87 \\ 3.57 \\ 5.93 \\ 0.95 \\ 6.31 \end{array}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5_host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 2$	287965236 $3519361216244401141100550361433$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\end{array}$	$\begin{array}{c} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.5\end{array}$	287965236263891266790216244411141100550371433	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\end{array}$	287965236442041769310216244411141100550371433	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47 \end{array}$	2879652363127840216244411141100550371433	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62 \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ \end{array}$	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ 0.63 \\ 0.16 \\ 10.23 \\ 8.21 \\ 7.28 \\ 0.87 \\ 3.57 \\ 5.93 \\ 0.95 \\ 6.31 \\ 8.43 \end{array}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5 profisafe_i5 profisafe_i5_host profisafe_i6	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62 \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.5\\ 3.59\end{array}$	287 965 236 266790 2162 4441 1141 1005 5037 1433 3234	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\end{array}$	287 965 236 442041 769310 2162 4441 1141 1005 5037 1433 3266	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\end{array}$	28796523631278402162444111411005503714333236	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ \end{array}$	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \end{array}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_alsve profisafe_i5_host profisafe_i6 profisafe_i6_host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 94 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 28 \\ 2$	287 965 236 3519361 2162 4440 1141 1005 5036 1433 3211 1296	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.5\\ 3.59\\ 8.65\end{array}$	287 965 236 263891 266790 2162 4441 1141 1005 5037 1433 3234 1296	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\end{array}$	287 965 236 442041 769310 2162 4441 1141 1005 5037 1433 3266 1296	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\end{array}$	28796523631278402162444111411005503714333236	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\end{array}$	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \end{array}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_noclal tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6_profisafe_i6_host profisafe_i6_host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 78 \\ 78 \\ 78 \\ 78 \\ 78 \\ 78$	287 965 236 3519361 2162 4440 1141 1005 5036 1433 3211 1296 4307	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.28\end{array}$	287 965 236 803777 888508 2162 4440 1141 1005 5036 1433 3211 1296 4272	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 3.59\\ 8.65\\ 2.88\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248 \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\\ 3.12 \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248 \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\end{array}$	28796523631278402162444111411005503714333236	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 72.22 \end{array}$	287 965 236 337247 354693 2162 4440 1141 1005 5036 1433 3211 1296 4272	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \end{array}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocleal tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host	$31 \\ 67 \\ 35 \\ 84 \\ 84 \\ 65 \\ 80 \\ 28 \\ 14 \\ 88 \\ 28 \\ 94 \\ 28 \\ 78 \\ 84 \\ 84$	287 965 236 3519361 2162 4440 1141 1005 5036 1433 3211 1296 4307 4306	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.08\\ \end{array}$	287 965 236 803777 888508 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 3.59\\ 8.65\\ 2.88\\ 2.08\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\\ 3.12\\ 2.73\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\end{array}$	28796523631278402162444111411005503714333236	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 72.22\\ 64.21\\ \end{array}$	287 965 236 337247 354693 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \end{array}$
profisafe_o4_slave         16         351         0.46         351         0.45         351         0.45         351         0.46         3503         4.22         3593         4.22         3592         4.01           profisafe_o6         106         3576         4.68         3603         4.81         3581         4.98         3577         4.54         3576         4.68           profisafe_o6         103         1437         9.07         1437         9.49         1437	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_ profisafe_i4_ profisafe_i5_ profisafe_i5_ profisafe_i5_ profisafe_i6_ profisafe_i6_ profisafe_i6_ profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 84\\ 84\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4307\\ 4306\\ 4303\end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.08\\ 2.28\end{array}$	287 965 236 803777 888508 2162 4440 11045 5036 1433 3211 1296 4272 4272 4269	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.5\\ 3.59\\ 8.65\\ 3.59\\ 8.68\\ 2.08\\ 2.08\\ 2.07\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\\ 3.12\\ 2.73\\ 2.49 \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 7693100\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 14881\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\end{array}$	287 965 236 3127840 2162 4441 1005 5037 1433 3236 1296	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 72.22\\ 64.21\\ 64.39\\ \end{array}$	287 965 236 337247 354693 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272 4269	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ 0.63 \\ 0.16 \\ 10.23 \\ 8.21 \\ 7.28 \\ 0.87 \\ 3.57 \\ 5.93 \\ 0.95 \\ 6.31 \\ 8.43 \\ 3.63 \\ 8.56 \\ 2.89 \\ 2.08 \\ 2.28 \end{array}$
profisafe o59935924.2835924.0336194.4435974.0735934.2235924.01profisafe o5 host3013157.8813158.2113158.3413157.9213158.213158.35profisafe o610635764.9235764.6836034.8135814.9835774.5435764.68profisafe o6 host3014379.5314379.0714379.4914379.7114379.1614379.59ftechnik3649464.3550514.2740574.0140573.8741423.9841644.18rhone tough6110.4610.3310.2510.9710.1710.31	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6 profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 84\\ 90\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4307\\ 4306\\ 4303\\ 4339\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.08\\ 2.28\\ 3.58\end{array}$	287 965 236 803777 888508 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272 4279 4339	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.5\\ 3.59\\ 8.65\\ 2.88\\ 2.08\\ 2.08\\ 2.07\\ 3.37\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\\ 3.12\\ 2.73\\ 2.49\\ 3.75 \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 314881\\ 4340\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.35\end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037 1433 3236 1296 4354	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 72.22\\ 64.21\\ 64.39\\ 3.69\\ \end{array}$	287 965 236 337247 354693 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272 4272 4279 4339	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \\ & 2.28 \\ & 3.35 \end{array}$
profisafe o5 host         30         1315         7.88         1315         8.21         1315         8.34         1315         7.92         1315         8.2         1315         8.35           profisafe o6         106         3576         4.92         3576         4.68         3603         4.81         3581         4.98         3577         4.54         3576         4.68           profisafe o6 host         30         1437         9.53         1437         9.07         1437         9.49         1437         9.71         1437         9.16         1437         9.59           ftechnik         36         4946         4.35         5051         4.27         4057         4.01         4057         3.87         4142         3.98         4164         4.18           rhone tough         61         10.46         10.33         10.25         10.97         10.17         10.3	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_profisafe_i5_profisafe_i6 profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_profisafe_o4_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 65\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 84\\ 90\\ 30\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4307\\ 4306\\ 4303\\ 4339\\ 1219\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.08\\ 2.28\\ 3.58\\ 6.03\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4272\\ 4272\\ 4269\\ 4339\\ 1219\end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 3.59\\ 8.65\\ 2.88\\ 2.08\\ 2.08\\ 2.08\\ 2.08\\ 3.37\\ 6.31\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ 1219\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\\ 3.12\\ 2.73\\ 2.49\\ 3.75\\ 6.05\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 14881\\ 14881\\ 4340\\ 1219\end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.35\\ 6.26\end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037 1433 3236 1296 4354 1219	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 72.22\\ 64.21\\ 64.39\\ 3.69\\ 5.99\\ \end{array}$	$\begin{array}{c} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4272\\ 4269\\ 4339\\ 1219\end{array}$	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \\ & 2.28 \\ & 3.35 \\ & 6.33 \end{array}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_bost profisafe_i5_host profisafe_i6_bost profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4bost profisafe_o4_host profisafe_o4_slave	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ \end{array}$	287 965 236 3519361 2162 4440 1141 1005 5036 1433 3211 1296 4307 4306 4309 1219 351	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.28\\ 3.58\\ 2.28\\ 3.58\\ 6.03\\ 0.46 \end{array}$	287 965 236 803777 888508 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272 4269 4339 1219 351	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 3.59\\ 8.65\\ 2.88\\ 2.08\\ 2.08\\ 2.07\\ 3.37\\ 6.31\\ 0.45\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ 1219\\ 351\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.59\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\\ 3.12\\ 2.73\\ 2.49\\ 3.75\\ 6.05\\ 0.45\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 14881\\ 4340\\ 1219\\ 351\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.355\\ 6.26\\ 0.46\\ \end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037 1433 3236 1296 4354 1219 351	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 72.22\\ 64.21\\ 64.39\\ 3.69\\ 3.69\\ 5.99\\ 0.46 \end{array}$	287 965 236 337247 354693 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272 4272 4269 4339 1219 351	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \\ & 2.28 \\ & 3.35 \\ & 6.33 \\ & 0.46 \end{array}$
profisafe o6 host         30         1437         9.53         1437         9.07         1437         9.49         1437         9.71         1437         9.16         1437         9.59           ftechnik         36         4946         4.35         5051         4.27         4057         4.01         4057         3.87         4142         3.98         4164         4.18           rhone tough         61         10.46         10.33         10.25         10.97         10.17         10.3	fzelle rhone_alps tbed_ctct tbed_noclal tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4host profisafe_o4_host profisafe_o4_host profisafe_o5	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4307\\ 4306\\ 4303\\ 4339\\ 1219\\ 351\\ 3592\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.08\\ 2.28\\ 3.58\\ 6.03\\ 0.46\\ 4.28\end{array}$	287 965 236 803777 888508 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272 4272 4269 4339 1219 351 3592	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 2.88\\ 2.08\\ 2.08\\ 2.07\\ 3.37\\ 6.31\\ 0.45\\ 4.03\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ 1219\\ 351\\ 3619\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 8.61\\ 3.78\\ 8.6\\ 3.12\\ 2.73\\ 2.49\\ 3.75\\ 6.05\\ 0.45\\ 4.44\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 14881\\ 4340\\ 1219\\ 351\\ 3597\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.35\\ 6.26\\ 0.46\\ 4.07\\ \end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037 1433 3236 1296 4354 1219 351 3593	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 72.22\\ 64.21\\ 64.39\\ 3.69\\ 5.99\\ 0.46\\ 4.22 \end{array}$	287 965 236 337247 354693 2162 4440 1141 1005 5036 1433 3211 1296 4272 4272 4272 4269 4339 1219 351 3592	$\begin{array}{r} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \\ & 2.28 \\ & 3.35 \\ & 6.33 \\ & 0.46 \\ & 4.01 \end{array}$
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 14\\ 88\\ 28\\ 94\\ 28\\ 84\\ 84\\ 84\\ 84\\ 84\\ 84\\ 90\\ 16\\ 99\\ 30\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4303\\ 4339\\ 1219\\ 3512\\ 3592\\ 1315\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 6.12\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.08\\ 2.28\\ 3.58\\ 6.03\\ 0.46\\ 4.28\\ 7.88\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4269\\ 4339\\ 1219\\ 3511\\ 3592\\ 1315\end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.5\\ 3.59\\ 8.65\\ 2.88\\ 2.08\\ 2.07\\ 3.37\\ 6.31\\ 0.45\\ 4.03\\ 8.21\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1000\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ 1219\\ 351\\ 3619\\ 1315\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.22\\ 4.22\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 6.32\\ 2.73\\ 3.78\\ 8.6\\ 3.12\\ 2.73\\ 3.75\\ 6.05\\ 0.45\\ 4.44\\ 8.34\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 11015\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 14881\\ 4340\\ 1219\\ 351\\ 3597\\ 1315\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.35\\ 6.26\\ 0.46\\ 4.07\\ 7.92 \end{array}$	287 965 236 3127840 2162 4441 1105 5037 1433 3236 1296 4354 1219 3513 3593 1315	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 6.56\\ 72.22\\ 64.21\\ 64.39\\ 3.69\\ 5.99\\ 0.46\\ 4.22\\ 8.2\\ 8.2\\ \end{array}$	$\begin{array}{c} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4269\\ 4339\\ 1219\\ 3511\\ 3592\\ 1315\\ \end{array}$	$\begin{array}{r} \hline \text{Time} \\ 0.15 \\ 0.63 \\ 0.16 \\ 10.23 \\ 8.21 \\ 7.28 \\ 0.87 \\ 3.57 \\ 5.93 \\ 0.95 \\ 6.31 \\ 8.43 \\ 3.63 \\ 8.56 \\ 2.89 \\ 2.08 \\ 2.28 \\ 3.35 \\ 6.33 \\ 0.46 \\ 4.01 \\ 8.35 \end{array}$
rhone_tough 61 10.46 10.33 10.25 10.97 10.17 10.3	fzelle rhone alps tbed_ctct tbed_nocell tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_ profisafe_i5_ profisafe_i6_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_host profisafe_o5_host profisafe_o5_host profisafe_o6_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 65\\ 80\\ 28\\ 84\\ 28\\ 78\\ 84\\ 84\\ 90\\ 300\\ 16\\ 99\\ 30\\ 106\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4303\\ 4307\\ 4306\\ 4303\\ 4339\\ 1219\\ 3511\\ 3592\\ 1315\\ 3576\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.28\\ 3.58\\ 6.03\\ 0.46\\ 4.28\\ 7.88\\ 4.92 \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4272\\ 4272\\ 4272\\ 4272\\ 1219\\ 3511\\ 3592\\ 1315\\ 3576\end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 3.59\\ 8.65\\ 2.88\\ 2.08\\ 2.07\\ 3.37\\ 6.31\\ 0.45\\ 4.03\\ 8.21\\ 4.68\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ 1219\\ 3511\\ 3619\\ 3513\\ 3603\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 8.61\\ 3.78\\ 8.66\\ 3.12\\ 2.73\\ 2.73\\ 2.49\\ 3.75\\ 6.05\\ 0.45\\ 4.44\\ 8.34\\ 4.81\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 31678\\ 314881\\ 4340\\ 1219\\ 3517\\ 3591\\ 1315\\ 3581\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.35\\ 6.26\\ 0.46\\ 4.07\\ 7.92\\ 4.98\end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037 1433 3236 1296 4354 1219 3593 31315 3577	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 64.21\\ 64.39\\ 3.69\\ 5.99\\ 0.46\\ 4.22\\ 8.2\\ 4.54\\ \end{array}$	$\begin{array}{c} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4272\\ 4272\\ 4272\\ 4272\\ 1219\\ 3592\\ 1315\\ 3576\\ \end{array}$	$\begin{array}{r} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \\ & 2.28 \\ & 3.35 \\ & 6.33 \\ & 0.46 \\ & 4.01 \\ & 8.35 \\ & 4.68 \end{array}$
	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_i6_host profisafe_inclusion_o4host profisafe_o4_profisafe_o4_profisafe_o4_profisafe_o4_profisafe_o5_host profisafe_o5_host profisafe_o6_host	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 84\\ 65\\ 28\\ 84\\ 14\\ 88\\ 94\\ 28\\ 78\\ 84\\ 84\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4307\\ 4306\\ 4303\\ 4339\\ 1219\\ 351\\ 3576\\ 1355\\ 53576\\ 1437\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 2.93\\ 3.28\\ 2.08\\ 2.08\\ 2.28\\ 3.58\\ 6.03\\ 0.46\\ 4.28\\ 7.88\\ 4.92\\ 9.53\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4269\\ 4339\\ 1219\\ 351\\ 3576\\ 1437\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 3.59\\ 8.65\\ 2.88\\ 2.08\\ 2.07\\ 3.37\\ 6.31\\ 0.45\\ 4.03\\ 8.21\\ 4.68\\ 9.07\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 263891\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ 1219\\ 351\\ 3619\\ 1315\\ 3603\\ 1437\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 4.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 2.73\\ 8.61\\ 3.78\\ 8.66\\ 3.12\\ 2.73\\ 3.75\\ 6.05\\ 0.45\\ 4.44\\ 8.34\\ 4.81\\ 9.49\\ 9.49\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 14881\\ 4340\\ 1219\\ 351\\ 3597\\ 1315\\ 3581\\ 1437\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.35\\ 6.26\\ 0.46\\ 4.07\\ 7.92\\ 4.98\\ 9.71 \end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037 1433 3236 1296 4354 1219 351 3593 1315 3577 1437	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 64.21\\ 64.39\\ 3.69\\ 5.99\\ 0.46\\ 4.22\\ 8.2\\ 8.2\\ 8.2\\ 4.54\\ 9.16\end{array}$	$\begin{array}{c} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4272\\ 4272\\ 4269\\ 4339\\ 1219\\ 351\\ 3576\\ 1355\\ 2576\\ 1437\\ \end{array}$	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \\ & 2.28 \\ & 3.35 \\ & 6.33 \\ & 0.46 \\ & 4.01 \\ & 8.35 \\ & 4.68 \\ & 9.59 \end{array}$
	fzelle rhone_alps tbed_ctct tbed_nocoll tbed_noderail verriegel4 profisafe_i4_host profisafe_i4_slave profisafe_i5_host profisafe_i5_host profisafe_i6_host profisafe_inclusion_i4host profisafe_inclusion_o4slave profisafe_o4_profisafe_o4_slave profisafe_o5_host profisafe_o5_host profisafe_o6_host ftechnik	$\begin{array}{c} 31\\ 67\\ 35\\ 84\\ 84\\ 84\\ 84\\ 88\\ 28\\ 94\\ 28\\ 88\\ 14\\ 88\\ 28\\ 94\\ 28\\ 88\\ 44\\ 90\\ 30\\ 16\\ 99\\ 30\\ 106\\ 30\\ 30\\ 36\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 3519361\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4307\\ 4306\\ 4303\\ 4339\\ 1219\\ 351\\ 3576\\ 1355\\ 53576\\ 1437\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.64\\ 0.16\\ 27.34\\ 86.06\\ 29.62\\ 0.92\\ 3.56\\ 5.93\\ 0.8\\ 8.59\\ 3.62\\ 8.59\\ 3.62\\ 8.59\\ 3.62\\ 8.59\\ 3.28\\ 2.08\\ 8.59\\ 3.62\\ 2.88\\ 3.58\\ 6.03\\ 0.46\\ 4.28\\ 7.88\\ 6.03\\ 0.46\\ 4.28\\ 7.88\\ 4.92\\ 9.53\\ 4.35\end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 803777\\ 888508\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4269\\ 4339\\ 1219\\ 351\\ 3576\\ 1437\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.63\\ 0.16\\ 14.38\\ 14.44\\ 12.34\\ 0.94\\ 3.57\\ 5.99\\ 0.94\\ 6.36\\ 8.55\\ 3.59\\ 8.65\\ 2.88\\ 2.08\\ 2.08\\ 2.08\\ 2.08\\ 2.08\\ 2.08\\ 3.37\\ 6.31\\ 0.45\\ 4.03\\ 8.21\\ 4.68\\ 9.07\\ 4.27\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 266790\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3234\\ 1296\\ 4248\\ 31685\\ 14888\\ 4354\\ 1219\\ 351\\ 3619\\ 1315\\ 3603\\ 1437\\ 4057\\ \end{array}$	$\begin{array}{c} 0.15\\ 0.55\\ 0.16\\ 25.25\\ 5.2\\ 0.89\\ 3.57\\ 5.99\\ 0.82\\ 2.73\\ 3.57\\ 6.32\\ 2.49\\ 3.75\\ 6.05\\ 0.45\\ 4.44\\ 4.81\\ 9.49\\ 4.01\\ \end{array}$	$\begin{array}{r} 287\\ 965\\ 236\\ 442041\\ 769310\\ 2162\\ 4441\\ 1141\\ 1005\\ 5037\\ 1433\\ 3266\\ 1296\\ 4248\\ 31678\\ 14881\\ 4340\\ 1219\\ 3511\\ 3597\\ 1315\\ 3597\\ 1315\\ 3581\\ 1437\\ 4057\\ \end{array}$	$\begin{array}{c} 0.2\\ 0.62\\ 0.16\\ 21.38\\ 6.39\\ 6.54\\ 0.86\\ 3.55\\ 5.99\\ 0.95\\ 6.13\\ 8.47\\ 3.65\\ 8.57\\ 2.86\\ 2.52\\ 2.28\\ 3.35\\ 6.26\\ 0.46\\ 4.07\\ 7.92\\ 4.98\\ 9.71\\ 3.87\\ \end{array}$	287 965 236 3127840 2162 4441 1141 1005 5037 1433 3236 1296 4354 1219 351 3593 1315 3577 1437	$\begin{array}{c} 0.14\\ 0.63\\ 0.16\\ 18.09\\ 82.17\\ 30.93\\ 0.86\\ 3.55\\ 5.95\\ 0.81\\ 6.3\\ 8.62\\ 3.86\\ 8.56\\ 64.21\\ 64.39\\ 0.46\\ 4.22\\ 8.22\\ 4.54\\ 9.16\\ 3.98\end{array}$	$\begin{array}{c} 287\\ 965\\ 236\\ 337247\\ 354693\\ 2162\\ 4440\\ 1141\\ 1005\\ 5036\\ 1433\\ 3211\\ 1296\\ 4272\\ 4272\\ 4272\\ 4272\\ 4272\\ 4272\\ 1359\\ 1219\\ 3516\\ 3576\\ 1437\\ 4164\\ \end{array}$	$\begin{array}{c} \hline \text{Time} \\ & 0.15 \\ & 0.63 \\ & 0.16 \\ & 10.23 \\ & 8.21 \\ & 7.28 \\ & 0.87 \\ & 3.57 \\ & 5.93 \\ & 0.95 \\ & 6.31 \\ & 8.43 \\ & 3.63 \\ & 8.56 \\ & 2.89 \\ & 2.08 \\ & 2.28 \\ & 3.35 \\ & 6.33 \\ & 0.46 \\ & 4.01 \\ & 8.35 \\ & 4.68 \\ & 9.59 \\ & 4.18 \end{array}$

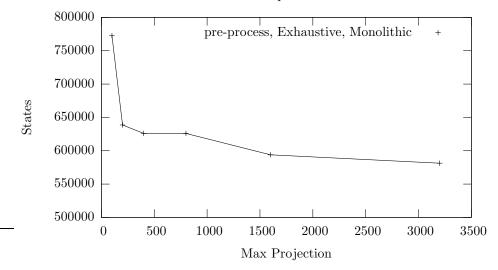
Table 6.5 MODULAR CONTROLLABILITY USING NON-EXHAUSTIVE PROJECTION AS PRE-PROCESS, MAX PROJECTION 1000

## $\begin{array}{c} {\rm Table~6.6} \\ {\rm MODULAR~PROJECTING~CONTROLLABILITY,~NON-EXHAUSTIVE,} \\ {\rm MAXCOMMONEVENTS} \end{array}$

Model		M	Modular projecting controllability, non-exhaustive, maxcommonevents										
		10	0	200		40	0	800		1600		320	00
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
tbed_ctct	84	1853	0.53	323	0.29	323	0.34	323	0.26	323	0.26	323	0.32
tbed_nocoll	84	201870	6.54	65161	7.52	74063	9.41	109016	13.89	163289	17.75	267650	34.61
tbed_noderail	84	176516	6.11	74124	6.69	90175	10.87	129152	16.28	184904	22.73	313859	38.8
rhone_tough	61		11.09		12.5		10.41		16	109870	10.07	121524	11.9
tbed_uncont	84	863808	11.54	374537	9.96	374855	11.48	240165	18.93	357395	43.02	489759	74.29

Table 6.7 MODULAR PROJECTING CONTROLLABILITY, NON-EXHAUSTIVE, MAXCOMMONEVENTS

Model		Modula	odular controllability using non-exhaustive projection as pre-p								e-proc	ess, maxe	common	events
		10	100		0	40	0	80	0	160	0		3200	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time	
tbed_ctct	84	551689	3.55	552005	3.54	552405	3.43	553205	3.49	554805	3.5	1059024		7.09
tbed_nocoll	84	440041	4.39	337351	9.46	337705	9.57	345856	12.76	1007593	44.82	1012393		43.11
tbed_noderail	84	477971	4.5	350404	9.41	354888	10.04	355688	10.03	192790	23.64	185627		49.27
rhone_tough	61		25.58		25.51		23.29		7.52		10.72			12.88
tbed_uncont	84	312859	2.63	100549	3.41	100903	3.42	108904	4.2	75361	9.43	117404		22.45



States in simplified tbed\_ctct

Figure 6.9: States in simplified tbed\_ctct

Model	Monolithic controllability using non-exhaustive projection as pre-process											ess	
		100		200		400		800		1600		3200	
Name	Aut	States	Time										
big_bmw	31	0	0.31	0	0.18	0	0.16	0	0.21	0	0.16	0	0.16
fzelle	67	4794	0.41	0	0.45	0	0.59	0	0.52	0	0.61	0	0.53
rhone_alps	35	0	0.18	0	0.18	0	0.18	0	0.18	0	0.18	0	0.18
tbed_ctct	84		11.8		11.25		11.09		11.09		11.46		12
tbed_nocoll	84	27659	0.87	9001	0.89	9001	0.93	8662	1.42	6780	7.77	6780	7.99
tbed_noderail	84	29928	0.95	9001	1.01	8658	1.22	8658	1.05	6561	6.08	6495	13.9
verriegel4	65	19470	0.49	1224	0.43	1224	0.47	0	0.7	0	0.81	0	0.82
profisafe_i4	80		19.41		19.23		21.67		24.48		24.12		25.8
profisafe_i4_host	28	106250	3.63	0	4.52	0	5.94	0	6.42	0	5.86	0	5.76
profisafe_i4_slave	14	3564	0.12	3564	0.11	3564	0.13	0	0.79	0	0.81	0	0.93
profisafe_i5	88		19.12		19.15		19.47		22.17		21.7		22.14
profisafe_i5_host	28	176130	6.16	0	5.66	0	8.25	0	9.11	0	8.62	0	8.36
profisafe_i6	94		20.32		20.6		21.34		23.86		24.6		27.43
profisafe_i6_host	28	187747	7.37	183957	8.5	0	9.72	0	9.41	0	9.08	0	9.1
profisafe_inclusion_i4host	78		14.76		15.29		15.47		15.78		16.55		18.93
profisafe_inclusion_o4host	84		17.99		17.86		17.73		17.92		18.09		20.51
profisafe_inclusion_o4slave	84		17.83		17.75		17.7		18.29		17.9		21.05
profisafe_04	90		19.78		19.37		19.24		22.95		23.06		23.95
profisafe_o4_host	- 30	198375	5.99	192809	6.23	0	6.51	0	6.13	0	6.44	0	6.14
profisafe_o4_slave	16	0	0.41	0	0.7	0	0.47	0	0.47	0	0.48	0	0.48
profisafe_o5	- 99		19.3		19.61		20.27		22.53		22.34		22.94
profisafe_o5_host	- 30	351431	11.38	343294	11.66	0	8.31	0	8.23	0	8.14	0	8.26
profisafe_06	106		20.42		20.91		21.14		24.86		24.93		25.54
profisafe_06_host	- 30	567931	20.46	556623	20.76	0	9.69	0	9.54	0	9.54	0	9.76
ftechnik	36	2	0.42	2	0.7	2	1.07	2	1.95	2	1.82	1	3.5
rhone_tough	61		10.18		10.32	848746	4.85	304138	2.34	256830	3.55	53538	7.44
tbed_uncont	84	8577	0.75	2903	0.85	2903	0.91	2788	1.45	2312	3.84	2183	8.47

Table 6.8 MONOLITHIC CONTROLLABILITY USING NON-EXHAUSTIVE PROJECTION AS PRE-PROCESS

Model			Monolithic controllability using exhaustive projection as pre-process										
		100		200		400		800		1600		3200	
Name	Aut	States	Time	States	Time	States	Time	States	Time	States	Time	States	Time
big_bmw	31	0	1.04	0	1.11	0	0.97	0	0.97	0	1	0	0.99
fzelle	67	0	0.74	0	0.78	0	0.89	0	0.95	0	1.03	0	0.99
rhone_alps	35	0	0.3	0	0.4	0	0.6	0	0.61	0	0.71	0	0.58
tbed_ctct	84	772545	4.39	638645	4.48	625946	5.87	625946	7.24	593879	17.17	581339	62.98
tbed_nocoll	84	9745	1.6	8703	2.15	8566	3.39	7624	10.54	6930	31.65	6930	143.19
tbed_noderail	84	9745	1.75	8703	2.24	7847	4.07	7606	10.94	6646	27.75	0	403.31
verriegel4	65	19470	0.94	0	1.4	0	2.03	0	2.52	0	3.16	0	3.63
profisafe_i4	80	0	19.47	0	45.68	0	84.26	0	194.78	0	411.53	0	731.33
profisafe_i4_host	28	0	8.92	0	15.86	0	27.66	0	30.33	0	32.06	0	40.55
profisafe_i4_slave	14	0	0.65	0	0.83	0	0.95	0	1	0	0.97	0	0.96
profisafe_i5	88		29.21	0	25.94	0	40.35	0	90.94	0	245.38	0	537.46
profisafe_i5_host	28	0	10.53	0	16.29	0	25.1	0	38.43	0	55.49	0	62.4
profisafe_i6	94		32.21	0	33.5	0	59.87	0	113.33	0	217.53	0	691.63
profisafe_i6_host	28	0	11.88	0	20.06	0	32.9	0	53.68	0	66.23	0	96.33
profisafe_inclusion_i4host	78	0	4.8	0	7.71	0	12.26	0	27.03	0	60.13	0	139.25
profisafe_inclusion_o4host	84	0	5.49	0	10.04	0	17.95	0	35.85	0	66.25	0	160.32
profisafe_inclusion_o4slave	84	0	4.16	0	7.26	0	11.54	0	26.5	0	72.69	0	161.99
profisafe_o4	-90	0	14.1	0	25.25	0	38.13	0	84.69	0	160.48	0	448.42
profisafe_o4_host	- 30	0	11.42	0	16.87	0	27.2	0	31.66	0	34.53	0	41.56
profisafe_o4_slave	16	0	0.95	0	1.01	0	1.01	0	1.02	0	1.03	0	1.03
profisafe_o5	- 99		30.93	0	27.05	0	42.53	0	90.94	0	166.02	0	898.49
profisafe_o5_host	- 30	0	13.61	0	19.16	0	30.55	0	49.13	0	64.26	0	70.48
profisafe_o6	106		34.91	0	32.42	0	49.81	0	126.79	0	239.45	0	498.96
profisafe_o6_host	30	0	15.28	0	22.97	0	31.95	0	65.41	0	75.62	0	107.68
ftechnik	36	2	2.42	1	4.52	1	6.48	1	13.66	1	35.71	1	62.17
rhone_tough	61	482058	3.29	177807	3.14	155964	6.41	90515	10.94	51975	41.6	41070	95.89
tbed_uncont	84	3159	1.56	2885	2.07	2878	3.27	2455	10.23	2231	23.81	2166	146.03

Table 6.9 MONOLITHIC CONTROLLABILITY USING EXHAUSTIVE PROJECTION AS PRE-PROCESS

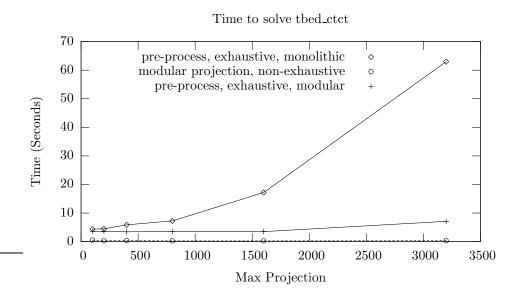
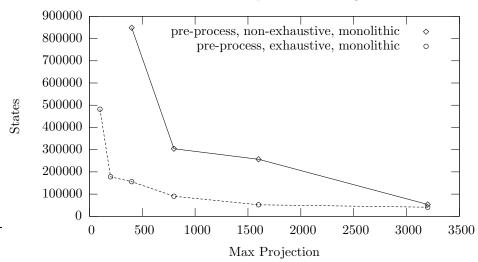


Figure 6.10: Time to solve tbed\_ctct



States in simplified rhone\_tough

Figure 6.11: States in simplified rhone\_tough

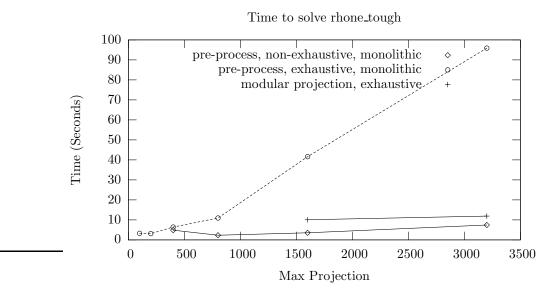


Figure 6.12: Time to solve rhone\_tough

# Chapter 7 Related Work

Ordered binary decision diagrams (OBDDs) are a method of representing large boolean formulae in with relatively little memory and can in some cases represent formulae with linear memory in relation with respect to the number of variables [5]. One of the ways of checking controllability on larger systems is to represent the states in the system and it's transition relation as an OBDD. Such a representation can in many cases deal with far larger state spaces than can regularly be explored.

Partial order reduction is a method of reducing the amount of the synchronous product of a set of automata we search by observing that many events in a model are actually independent of one another, and as such we don't care in what order they occur [5]. We can exploit this by when it is appropriate only exploring the states reached by taking one arbitrary ordering of these events sometimes dramatically reduce the number of states considered. It should be noted that projection seems to remove independence between events anyway.

# Chapter 8 Conclusion

The modular method of checking controllability has been implemented in the WATERS toolkit and the experimental results have shown its performance to be equivalent to that shown by the original implementation [3]. In addition to this, several variations of the controllability checker were developed. Of these the Parallel and Culling checker, while showing some promise did not bring much improvement over the standard modular approach to controllability checking. The projecting approach, however showed lots of improvement in performance, in particular being capable of solving the rhone\_tough problem. This had up till this point never been solved before.

Future work could include looking into ways of improving the performance of the determinisation step of the controllability checker. A possible way of doing this could be to use a OBDD [5] to represent the automaton which we are attempting to determinise. Also, as intuitively projection should gain the best results when two automata which are related to each other are projected together, and the person who designed the model should ideally know which parts of the model are most related to one another, it could be useful to make it possible for the person modelling to put in information stating that these automata naturally go together and then use that information when projecting. Also it seems that the heuristics for selecting new automata to add to the composition for modular checking could be improved. One way of doing this could be to instead of finding just one counterexample in a composition, to find a number of counterexamples and then perhaps select which new automata to add to the composition based upon what number of these counterexamples it rejects.

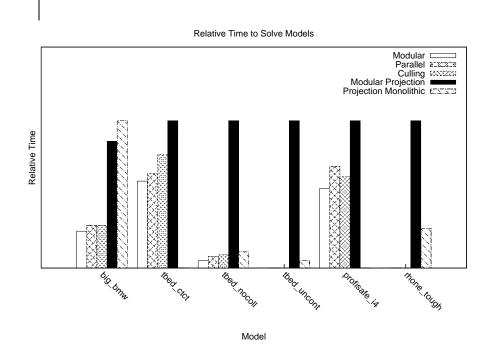


Figure 8.1: Synchronous product of Small factory with modified buffer

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