Formal methods in support of SMC design

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Fig. 1.1 *Functional and performance analysis using the $\chi$ environment* and its copy Figure 6.1 are replaced by the Fig. 1.1.

Signal emission operator $u \circ p$ behaves as $p$ for valuations where a predicate $u$ over the variables (including the variable $time$) holds; it is inconsistent for valuations where $u$ does not hold. It also emits a signal that can be inspected by processes in parallel.

The supervisor sends commands to the lift to go up $lift\_move!1$ or down $lift\_move!0$. Similarly, it commands the pusher to retract $pusher\_move!1$ or extract $pusher\_move!0$. The supervisor is notified when the corresponding action has been performed via channels $lift\_done$, $pusher\_done$. We assume that extracting or retracting the pusher takes 2 time units, and lift movements take 5 time units. The $\chi$ model of the pusher-lift system is depicted in Fig. 2.2.

In Fig. 2.2 a parenthesis is removed

|| *($lift\_move?b_1; (b_1 = 0 \rightarrow \Delta 5; lift\_done! \parallel b_1 = 1 \rightarrow \Delta 5; lift\_done!)$)

Finally, two minor errors have been discovered by verification of property 4 and 5, one modeling mistake and one mistake in the manual transformation from the original $\chi$ model to the translatable $\chi$ model. This kind of mistakes can be avoided by using only the translatable subset of $\chi$ to create models intended for further verification, and by implementing the transformations as a part of the translator in cases when it is possible.

The reduced transition system is equivalent to the original one with respect to a CTL*-X property $\phi$...

Furthermore, each sequential process has a set of local variables and cannot observe local variables of other processes. It is assumed that there is no shared (global) variables.
the edge labeled with false leads to the node of the statement that should be executed after the while construct.

there is a transition $\langle \langle l, \sigma \rangle, \langle l', \sigma' \rangle \rangle \in Tr$, such that $\sigma'(x) = \sigma(e)$, and the values of...

$(\langle l, \sigma \rangle, \langle l', \sigma' \rangle) \in Tr$, such that $\sigma'(x) = \sigma(e_i)$, and the values of all other program...

In the Section 5.1.2, the following item should be added.

- $n$ is associated with the program location of a send or receive action, or a statement immediately following a communication action (send or receive).

To the phrase $I \subseteq N$ is a set of initial nodes\(^3\), the following footnote is added

\(^3\)We use a set of initial nodes to avoid auxiliary nodes and transitions. For instance, to create a control flow graph of an alternative composition with a single initial node we would need to add an auxiliary node and its outgoing transitions that would lead to the nodes labeled with the first statement of the corresponding process terms. Let us take a process term skip $x := 1$ as an example. Then, the auxiliary initial node would have an empty label and two outgoing transitions: to the node labeled with skip and to the node labeled with $x := 1$.

The header 5.2.4 Relation between original Chi models and their control flow graphs is removed.
Figure 1.1: Functional and performance analysis using the $\chi$ environment.