

# Towards automatic verification of Matlab State Charts — Formalising a language for test cases\*

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## Abstract

Effort has been made on automatic verification of state charts within the last years. This mainly covers automatic verification of properties which can be derived on any state chart. An aim of the project HPSV is automatic verification of given proof obligation statements on a given state chart.

The verification itself is planned to be realised by using a parallel SMT solver. Thus transformation of state charts and proof obligation statements to first-order logic is required. The transformed first-order logic of the state chart shall define variable and state changes of the given chart at any time step. That is why state charts using fixed time steps are supported only. Proof obligation statements may refer to time steps as well.

MES, a project partner, has developed a language for testing Simulink models. This language allows for mapping to variables and enables to constrain their dependencies including time steps within a Simulink model. As Matlab State Charts are an optional extension of Simulink models, this language may be used for testing these as well. Formalising the semantics of this language by transforming any test definition into SMT first-order logic enables to use the test cases as proof obligation statements on state chart verification. The presented formalisation is work in progress addressing this automatic transformation of test cases to proof obligation statements.

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