

# **A Concept for Semi-Automatic Configuration of Sufficiently Valid Simulation Setups for Automated Driving Systems**

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As simulation is increasingly used in scenario-based approaches to test Automated Driving Systems, the credibility of simulation results is a major concern. Arguably, credibility depends on the validity of the simulation setup and simulation models. When selecting appropriate simulation models, a trade-off must be made between validity, often connected to the model's fidelity, and cost of computation. However, due to the large number of test cases, expert-based methods to create sufficiently valid simulation setups seem infeasible. We propose using design contracts in order to semi-automatically compose simulation setups for given test cases from simulation models and to derive requirements for the simulation models, supporting separation of concerns between simulation model developers and users. Simulation model contracts represent their validity domains by capturing a validity guarantee and the associated operating conditions in an assumption. We then require the composition of the simulation model contracts to refine a test case contract. The latter contract captures the operating conditions of the test case in its assumption and validity requirements in its guarantee. Based on this idea, we present a framework that supports the compositional configuration of simulation setups based on the contracts and a method to derive runtime monitors for these simulation setups.

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