

Numerical Challenges in Simulation-guided Dynamical System Analysis

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Abstract

Verification and validation (V&V) for industrial control designs can be a difficult and expensive process. Simulation-guided approaches offer a practical means of performing V&V for industrial applications. One such technology uses simulation traces to discover Lyapunov functions or barrier certificates. This technique has proved promising; however, there are challenges related to the numerical computations involved. For example, the technique translates data obtained from simulation traces into a large collection of linear constraints, but not all of these constraints are necessarily useful for solving the problem. Strategies for selecting an appropriate subset of these constraints are required. In this talk, we present an overview of the simulation-guided analysis approach and discuss these numerical challenges.