A CSP Approach to Design CPS

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Résumé

Cyber-physical systems mix continuous-time dynamics and sampling-based behaviors, which constantly and continuously interact each other. These two parts have to consider as a whole during the design and the verification phases in order to produce a system fulfilling expected properties. Constraint satisfaction problem is a framework allowing the description of system and properties by a set of constraints. Recently, an extension of this framework with ordinary differential equations has offered a new framework for cyber-physical systems. One of the strength of this framework is to allow the description of systems considering bounded uncertainties in models. When constraint satisfaction problems are solved with set-membership solvers reliable results are produced. An overview of this framework is given and illustrates through examples such as robust controller synthesis, parameter design synthesis or reliable path planning algorithms.

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