An Incremental Model-Based Design Methodology to Develop CPS with SysML/OCL/Reo

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Résumé

Modeling Cyber-Physical Systems (CPS) remains a challenge due to their interconnected networks of heterogeneous embedded systems that operate in a physical environment. In this paper, we introduce a new modeling approach that relies on SysML, OCL, and Reo to capture the different aspects of CPS, including requirements, architecture, and interaction protocols. The novelty of our approach relies in the combination of SysML and Reo to handle the complexity of CPS architecture and protocols, in the design step by proceeding incrementally. Furthermore, we define OCL constraints to specify rules to be respected to model consistently CPS.

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