Designing Cyber-Physical Systems using aDSL: a Domain-Specific Language and Tool Support

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Context & Problem statement

- Cyber-physical systems (CPSs)
  - Integrate computation, software, networking and physical processes
  - A CPS model extends an embedded system model with networking, time synchronization, and interoperability.
  - We propose aDSL, a DSL with tool support for the interoperability of CPSs

aDSL objectives:

- Provide a formal language that enables unambiguous definition and reasoning
- Enable the definition of requirements that constraint operation modes to reason about interoperability
- Automatically evaluate design alternatives

We have satisfied the three requirements of aDSL, as mentioned in the objectives.

Evaluating operation spaces

aDSL automatically derives the operation space of each subsystem in a bottom-up fashion; the result depends on its operation space and the operation spaces of its children.

When operation spaces have overlapping dimensions, the intersection of their values is taken. Otherwise, the dimension and its values are simply copied to a higher level.

Poster session

http://www.a-dsl.org