

Tutorial Proposal

Dynamic Optimization of Modelica Models with JModelica and Optimica

Model-based simulation, optimization, and verification are essential in industry today. Optimization is increasingly used as a standard tool to improve operation, both in on-line and off-line applications. Examples in manufacturing industry are calculation of operating points and transition plans that maximize production while minimizing utilization of raw material, energy, and other resources.

A wealth of numerical optimization methods are available, both commercially and as open source. Commonly, such algorithms are written in C or Fortran and requires substantial effort in terms of model encoding and/or interfacing of modeling and simulation software.

The novel modelica-based open source project JModelica is particularly targeted at dynamic optimization of Modelica models. To meet this end, a language extension of Modelica, Optimica, has been defined. Optimica enables the user to encode dynamic optimization problems in a high-level description format on par with that of Modelica. The JModelica platform is intended to provide a flexible and extensible Modelica environment focused on optimization, with the particular objective of bridging the gap between the details of numerical algorithms and the engineering need for high-level description formats. JModelica also features a convenient scripting environment built on Python.

The tutorial will give an introduction to the JModelica platform and provide hands on examples of how to use JModelica and Optimica to solve relevant optimization problems.

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