JModelica.org

Modelon AB
Ideon Science Park, SE-223 70 Lund, Sweden

JModelica.org is an open source project with the mission:

"To offer a community-based, free, open source, accessible, user and application oriented Modelica environment for optimization and simulation of complex dynamic systems, built on well-recognized technology and supporting major platforms."

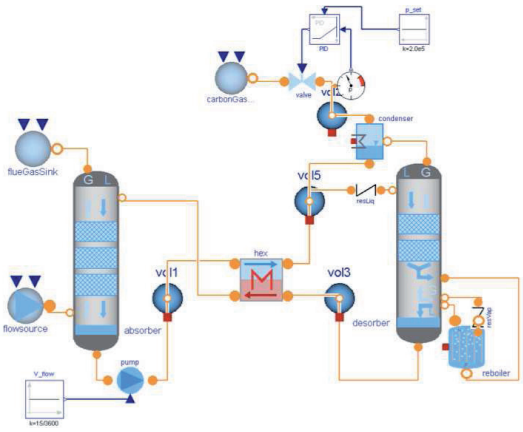

Figure 1: A CO_2 capture model used for optimization.

JModelica.org supports dynamic optimization of Modelica models, a class of problems that includes a wide range of applications such as parameter estimation, design optimization, and optimal control problems. To meet this end, JModelica.org supports Optimica, which is an extension to the Modelica language that offers language constructs for encoding of cost functions, constraints and the optimization interval with fixed or free end points. The optimization algorithms provided with JModelica.org have been developed based on experiences from optimization of several industrial size systems, including an industrial robot, a polyethylene production plant and a CO_2 capture systems. Problems with up to 1.000 differential and algebraic equations have been successfully optimized.

JModelica.org also supports simulation of Modelica models. In this area, full support for the novel standard Functional Mock-up Interface for Model Exchange (FMI) is provided. FMI compliant models (FMUs) can be simulated with a performance that is on par with state of the art commercial tools. JModelica.org also supports export of FMUs from Modelica code. State of the art integrators in the SUNDIALS suite are supported through the simulation package Assimulo.

The user interface in JModelica.org is based on the Python scripting language. Python provides an open source environment with strong support for scientific computations, including linear algebra and plotting. Models are represented by Python objects, which provide convenient methods for setting parameters, simulation, initialization and optimization.

The roadmap of JModelica.org contains improved Modelica compliance of the compiler front-end and support for simulation-based optimization by means of derivative free optimization methods (DFO).

For more information, visit the project web site `http://www.jmodelica.org` and the development site `http://trac.jmodelica.org`.