EMPHYSIS –
D4.6 OpenModelica equation code prototype

ITEA 3

Version 1, (Release) January 2020

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Introduction

An import goal of the EMPHYSIS project is to develop a proposal for the eFMI standard. Sadly, the equation code standard is not complete. However, OpenModelica does include a prototype of a partial draft of the equation code standard (also known as Flat Modelica). The specification was drafted together with the Modelica Association and can be followed at: https://github.com/modelica/ModelicaSpecification/tree/MCP/0031.

Installation

The OpenModelica prototype implementing Flat Modelica is version 1.16.2 and can be downloaded at: https://openmodelica.org/.

Usage

By using the flags -d=newInst -f, OpenModelica will produce Flat Modelica output when instantiating a model.

Example

```
setCommandLineOptions("-d=newInst -f");
loadFile("EMPHYSIS_TestCases/package.mo");
writeFile("a.mof", instantiateModel(EMPHYSIS_TestCases.M01_SimplePI.ModelsToExport.Controller));
getErrorString();
```

Which gives the following output when run:

```
class 'EMPHYSIS_TestCases.M01_SimplePI.ModelsToExport.Controller'
type 'Modelica.Blocks.Types.Init' = enumeration(NoInit, SteadyState, InitialState, InitialOutput);

  public parameter Real 'k' = 110.0;
  public parameter Real 'T'(unit = "s", quantity = "Time") = 0.1;
  public Real 'feedback.u1';
  public Real 'feedback.u2';
  public Real 'feedback.y';
  public parameter Real 'PI.k'(unit = "1") = 'k';
  public parameter Real 'PI.T'(start = 1.0, min = 1e-60, unit = "s", quantity = "Time") = 'T';
  public parameter 'Modelica.Blocks.Types.Init' 'PI.initType' = 'Modelica.Blocks.Types.Init'.InitialState;
  public parameter Real 'PI.x_start' = 0.0;
  public parameter Real 'PI.y_start' = 0.0;
  public Real 'PI.u';
  public Real 'PI.y';
  public Real 'PI.x'(start = 'PI.x_start', max = 100.0, min = -100.0);
  public input Real 'r'(max = 10000.0, min = -10000.0);
  public input Real 'y'(max = 10000.0, min = -10000.0);
  public output Real 'u'(max = 10000000.0, min = -10000000.0);
public
initial equation
  'PI.x' = 'PI.x_start';
equation
  'feedback.y' = 'PI.u';
  'r' = 'feedback.u1';
  'y' = 'feedback.u2';
  'u' = 'PI.y';
  'feedback.y' = 'feedback.u1' - 'feedback.u2';
  der('PI.x') = 'PI.u' / 'PI.T';
  'PI.y' = 'PI.k' * ('PI.x' + 'PI.u');
end 'EMPHYSIS_TestCases.M01_SimplePI.ModelsToExport.Controller';
```