WORKSHOP 4.4

External Code

Contents

Introduction

This workshop will cover:

- Implementation and usage of an external C-function.

External C function

1) We will create and simulate a function in Modelica that uses an external C function. For this purpose, create a package inside your training package with the name *W4-ExternalCode*.
2) Implement the c-function that does the actual calculations. Name it *power*, and upload it to the /*Resource* folder.

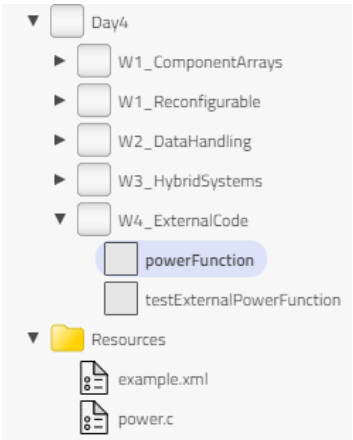
power.c

```
double power(double val, int pow)
{       double ret_val = 1.0;
        int i;

        for(i = 0; i < pow; i++)
                ret_val *= val;

        return(ret_val);
}
```

Modelica wrapper function

3) Inside this package, create a function in Modelica that raises a real value to the power of an *int*, i.e. implement a function that calculates *real^int*. The actual calculation should be done in the external c-function. The code should look like:

```
function powerFunction
  input  Real value;
  input  Integer p;
  output Real y;
  external "C" y =power(value,p)
annotation (
IncludeDirectory="modelica://Day4/Resources/",
Include="#include <power.c>");
end powerFunction;
```



4) Note that the path to where you have stored the c-code is mentioned using the annotation *IncludeDirectory* and the folder is referenced using "modelica*://* URI."

Test the external function

5) Create a model that uses the powerFunction to calculate some values.

```
model testExternalPowerFunction
    Integer[nbr] p = 0:8;
    Real[nbr] y;
protected
    parameter Integer nbr = 9;
equation
    for i in 1:nbr loop
        y[i]=ImpactTrainingSolutions.Day4.W4_ExternalCode.powerFunction(2,p[i]);
    end for;
end testExternalPowerFunction;
```

6) Simulate the test model and plot the output values of y.
Use the view button to easily see the vector values.