

Introduction to Modelica

The goal of this reading activity to get familiar with the context of Modelica: design goal, history, tools, and comparison with other modeling tools.

Timing

I believe that this activity should take **30 minutes** of your time. Please take a watch and monitor the time you spend so that I can update my claim.

Total time spent: _____ minutes

Reading

Read the first chapter (“Introduction”) of the book by Michael M. Tiller “*Introduction to physical modeling with Modelica*” (available at the campus library with call number “003.3 TIL”).

You can complement this reading by quickly looking at these introductory slides:

- Martin Otter “*Modelica Overview*”
- Peter Fritzson, Bernhard Thiele “*Part I: Introduction to Modelica ...*”

cf. links on <http://éole.net/courses/modelica/90-references.html>

Questions

1 Language and tools

Q1) Modelica is a:

- non-proprietary language (the language specification is openly available)
- proprietary language (the specification is the secret propriety of its creators)

Q2) Models written in the Modelica language can be simulated using:

- free, open source, environments. If true, cite one: _____
- commercial environments. If true, cite one: _____

2 Applicability of Modelica

Q3) What kind of engineering domains can be modeled with the Modelica language

- Mechanical systems
- Control systems
- Electrical systems
- Fluidic systems
- Chemical systems
- Heating systems

Q4) Summarize the *applicability* of Modelica in a compact expression:

“Modelica is a _____ language.”

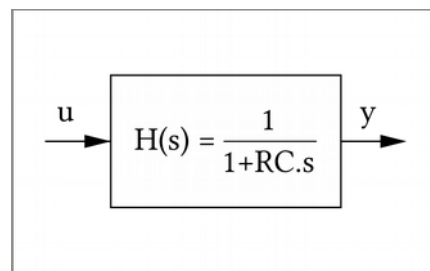
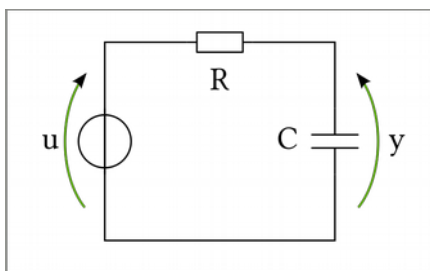
Q5) It seems obviously positive to have a modeling tool that can cover as many domains as possible. However, let's think of reversed arguments: *what could be the benefits of a tool targeting only a narrow application domain?*

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3 Modeling formalism: causal / acausal

Q6) Typology and formalism of models:

- Which of the following models are causal/acausal?
- Name the type of each model



$$\begin{aligned} \frac{dv_C}{dt} &= -v_C/RC + u/RC \\ y &= v_C \end{aligned}$$

$$\begin{aligned} u &= v_R + v_C \\ v_R &= R \cdot i \\ i &= C \cdot \frac{dv_C}{dt} \\ y &= v_C \end{aligned}$$

4 Your experience in modeling

Q7) List the modeling tools or languages you have already used. For each tool, specify:

- accessibility: proprietary or open source tool?
- domain: which physical/engineering domain targeted by the tool?
- modeling formalism: causal or acausal ?

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