

SIM2LUS

Translation from Simulink to Lustre

Supported Simulink blocks

- Only ***discrete-time Simulink blocks***
 - blocks of the "Discrete" library,
 - generic mathematical operators (sum, gain, logical and relational operators)
 - other useful operators, such as switches
- ***Simulink model with open input***, which is the case of embedded controllers.
- See the manual for usual known blocks

Usual known Blocks

- Sources
- Inport, Constant, DiscretePulseGenerator,
- Random, DataTypeConversion
- Outport, Ground, Terminator
- Discrete
- UnitDelay
- Zero-OrderHold
- Math Operations
- Sum, Product, Gain, CombinatorialLogic,
- LogicalOperator, RelationalOperator
- Signal Routing
- Mux, Demux, BusCreator, BusSelector, Switch
- Signal Attributes
- DataTypeConversion Ports & Subsystems
- Subsystem, Trigger, Enable
- Saturation, Lookup2D

Usual non-translatable blocks

- Sinks
- Scope, Probe, Display
- **S-functions or Matlab functions**
- and others

Supported Simulink features

- “Semantics” of a Simulink model is defined by its simulation traces.
- Therefore, simulation options should be provided
- Not all simulation options are supported

Supported Simulation options (1)

- **Solving methods.** Restrict only to one method: "**solver: fixed-step, discrete**" and "**mode: auto**".
 - Simulink models must be simulated correctly under the above simulation method before feeding them to **sim2lus**.
- **Sampling time.** for every input a sampling time is explicitly specified.

Supported Simulation options (2)

- **Type checks. BLS** ("Boolean logic signals" flag, in "advanced" menu in some versions) **is on** - inputs and outputs of logical blocks (and, or, not) must be of type boolean.
- **Set the "algebraic loop" detection mechanism of Simulink to the strictest degree: Error** (in "diagnostics" menu in some versions)

How to use SIM2LUS

- To access to the tool, add the following line in “.bashrc”:
source /user/5/raymond/mdl2lus2osek/
SETENV.sh
- Before translating, check if the model contains only discrete-time blocks, check the simulation options
- The tool is invoked simply by `mdl2lus`.
- To translate only a subsystem, `mdl2lus Sys.mdl -system Subsys`