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-translatableable 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`