# The CyPhy HibridSAL Verifier

The Verifier takes a Simulink model in ESMoL format, and converts it to a hybrid automata in the format of HybridSAL input file. Additionaly a CyPhy FormalRequirement model element contains the LTL expression to be verified by HybridSAL. The Verifier executes the tool, and then the retrieved result is added to the formal requirement.

The tool traverses the ESMol model, collects the input and output ports, along with the Simulink blocks. The Verifier supports the following blocks: integrator, integrator with saturation, sums, saturation, constant, gain, as well as input and output ports. It collects the equations from the characteristics of the components and their connectivity, and then it simplifies the matrix with a custom elimination. Considering the discrete states of the saturation components, the Verifier creates the hybrid automaton.

# Limitations of the CyPhy HibridSAL Verifier

Currently, the Verifier does not support subsystem hierarchies, only a flat model is assumed. Also, the reset signal still poses a challenge to the tool chain. The Verifier ignores the components bus creator, scope, and sin.

# CyPhy HibridSAL Verifier Files

The distribution consists of a single file:

The setup installs the following groups of files: *setup\_ISIS-HybridSALVerifierxxx.exe*.

* \bin\ HybridSALVerifierPlugin.dll: interpreter component
* \bin\ HybridSALVerifierPlugin.tlb: type library for the interpreter
* \ readme.txt: guide to run the tool and the case studies
* \src\\*: source (cs source files, snk signature, csproj and sln project files)
* \samples\CACSample: case study. CAC\_FlowControl.mdl (Simulink file), CAC\_FlowControl\_ESMoL.xme (ESMol representation of the Simulink File), ESMoLMeta.xme (ESMol language specification), and the CyPhy model (CAC\_FlowControl\_CyPhy.xme).