How to Create a Circuit Model

Procedure

This article describes the requirements for creating a circuit model to simulate with the **eHS Solver**.

1. Consider using an existing circuit model from the **Examples** section as a starting point.
2. Open MathWorks Simulink to use the Simscape Electrical Specialized Power Systems Simulink Blockset. See **Supported Circuit Editors** for more information.
3. Add a **powergui** block to the Simulink model.
4. *Optional*: Double click the powergui block and navigate to the **Solver** tab. Configure the parameters as shown below:

Simulation type	Discrete
Solver type	Backward Euler
Sample time (s)	1e-6

5. *Optional*: Navigate to **Simulation >> Configuration Parameters >> Solver**, and set the **Solver Type** to Fixed-Step. Under **Additional Parameters**, set the **Fixed Step Size** to 1e-6 (this value must match the one in the powergui block).

    Note: The parameters configured in steps 4 and 5 do not affect the eHS solver; they are used only if the model is executed directly in Simulink (offline mode). Offline simulation is typically done for model validation purposes, and to generate benchmark data to compare against the results from the eHS Solver. The Discrete Backward Euler solver generates offline results most similar to those of the eHS solver.

6. Build the circuit using only **supported components**.
7. Add Current and Voltage **Measurement** blocks at locations of interest. The eHS solver will output these measurements during the simulation.
8. Configure the parameters of each individual component and provide descriptive names. It is recommended, but not required, to start **Source** component names with the index U*XX*, **Switch** component names with SW*XX*, and **Measurement** component names with Y*XX*.
9. Add a **Ground** block to the circuit. This is required.
10. *Optional*: Add Scope blocks and signal generators to the source components to allow the model to generate results offline. Note that these and any other components not supported by the eHS solver will be ignored during the FPGA simulation. They are for offline execution only.
11. **Save** the model and press **Run** to confirm that there are no errors. A model that does not run successfully cannot be loaded into eHS.
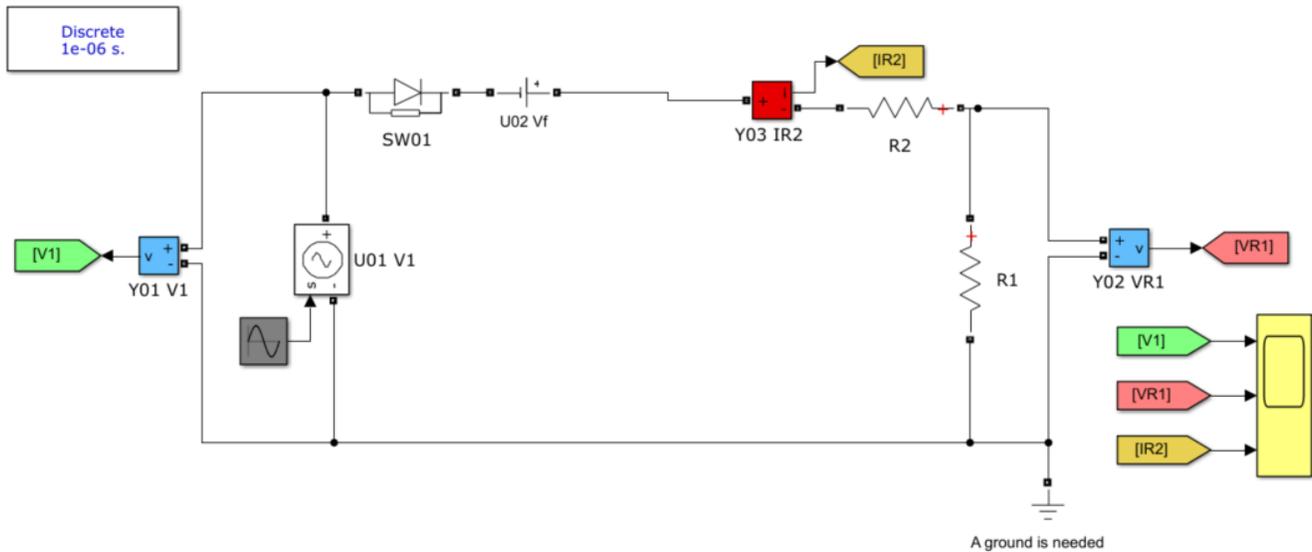

Figure 1. A Half-Wave Rectifier and Voltage Divider circuit model. In this model, the Sine Wave block (grey), Scope block (yellow), and Goto Tags exist for offline simulation purposes only, and will be ignored by the eHS Solver when the circuit is simulated on the FPGA.

Related Links

How to Add a Circuit Model to the System Definition

How to Simulate a Three Phase Voltage Source using Sinewave Generators

How to Simulate a Drive with a Machine