ACSL_Entity VTB Model

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Model name: ACSL_Entity
DLL name: ACSL_Entity.vtm
Version number: 1.0
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Pictorial Representation of Model

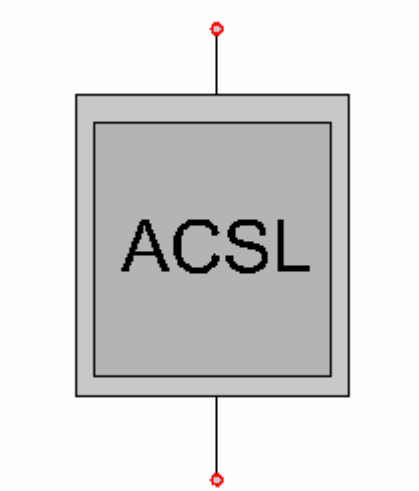


Figure 1 - ACSL_Entity Icon

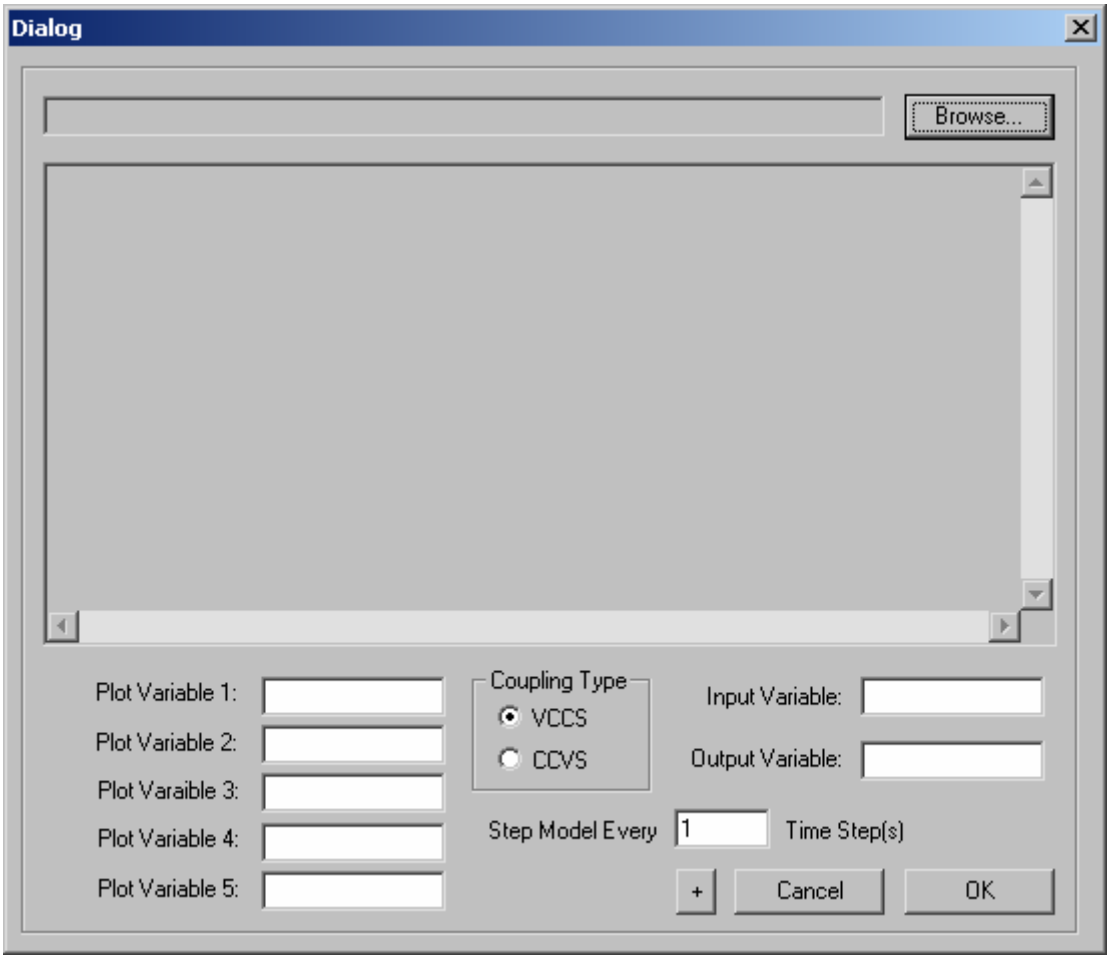


Figure 2 - ACSL_Entity properties dialog

Brief Description of Model

This model wraps a model created in ACSL. The ACSL_Entity model allows for a natural coupling between the VTB system and the ACSL model.

Model Validity Range and Limitations

The ACSL_Entity model can be coupled to the VTB system that contains it in two ways, either by acting as a voltage controlled current source or as a current controlled voltage source. If the model is chosen to act as a VCCS then an ideal current sources should be the input to the model. The same holds true for CCVS coupling, in this case the input to the model should not be an ideal voltage source. Furthermore, there can only be one ACSL model in any schematic. This is a limitation of the ACSL API (Application Programmers Interface) provided by the makers of ACSL.

List of Model Pins with Connectivity Information

Pin Designation	Description
Input 1	The voltage or current at this pin will be input to a variable of the ACSL model. The variable will be determined by the corresponding parameter value (see parameter descriptions).
Output 1	The internal ACSL value of a variable will be

	shown as a magnitude at this pin. It will act as an ideal voltage source or current source depending on the coupling type chosen. The variable is determined by its corresponding parameter value (see parameter descriptions).

List of Parameters and Output Variables

This is a complete list of all parameters of the model. All models use SI units.

Parameter Name	Description	Default Value	Units
ACSL model file path	This is the path to the ACSL model to use.	Empty	N/A
Input variable 1	The exact name of the ACSL variable that will receive the input value from input pin 1.	Empty	Dependent on the coupling type selected
Output variable 1	The exact name of the ACSL variable whose value will be output on output pin 1.	Empty	Dependent on the coupling type selected
Coupling Type	The type of ideal source that the model should be in the simulation.	VCCS	N/A
ACSL plot variable 1	Name of internal ACSL variable that will be viewable.	Empty	N/A
ACSL plot variable 2	Name of internal ACSL variable that will be viewable.	Empty	N/A
ACSL plot variable 3	Name of internal ACSL variable that will be viewable.	Empty	N/A
ACSL plot variable 4	Name of internal ACSL variable that will be viewable.	Empty	N/A
ACSL plot variable 5	Name of internal ACSL variable that will be viewable.	Empty	N/A
Number of steps in VTB before stepping the ACSL model	This parameter allows the ACSL model to be stepped at some multiple of the step used in VTB	1 step	N/A
ACSL stop variable name	The name of the ACSL variable that is used to determine the stop condition for the ACSL model	TSTOP	N/A

This is a list of output variables.

Variable Name	Description	Units
Output 1	The output at output pin 1.	Dependent on the coupling type selected

ACSL variable 1	An internal ACSL variable that can be plotted.	N/A
ACSL variable 2	An internal ACSL variable that can be plotted.	N/A
ACSL variable 3	An internal ACSL variable that can be plotted.	N/A
ACSL variable 4	An internal ACSL variable that can be plotted.	N/A
ACSL variable 5	An internal ACSL variable that can be plotted.	N/A

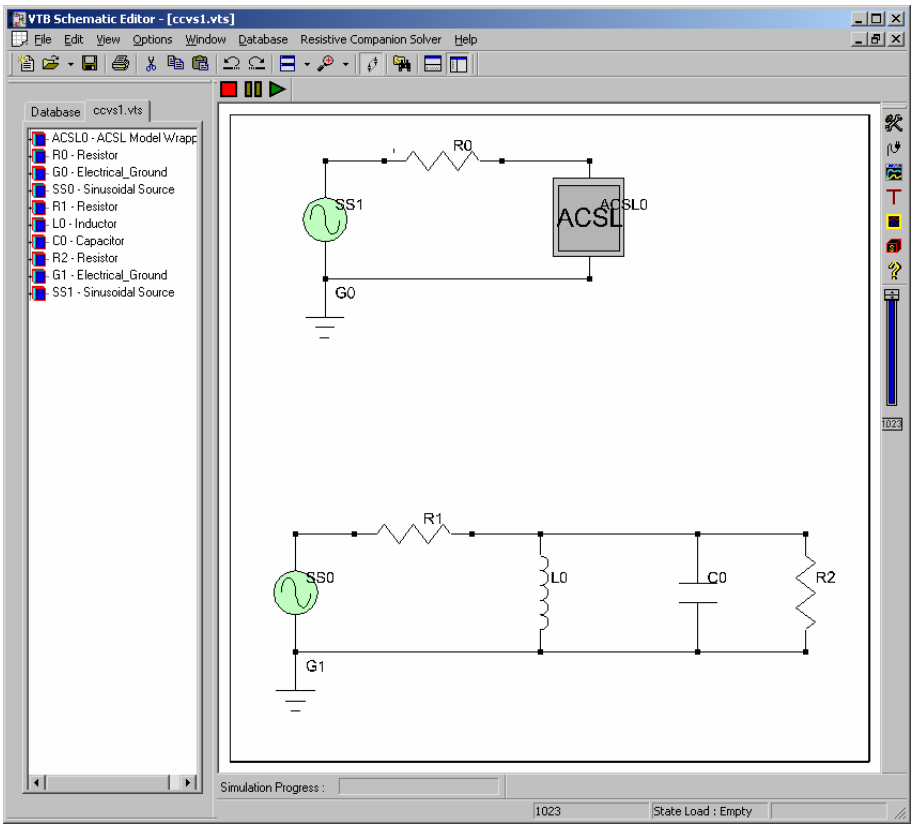
Assumptions in Model Derivation

The ACSL_Entity model is coupled to the containing VTB system as an ideal controlled voltage or current source.

Mathematical Description of Model

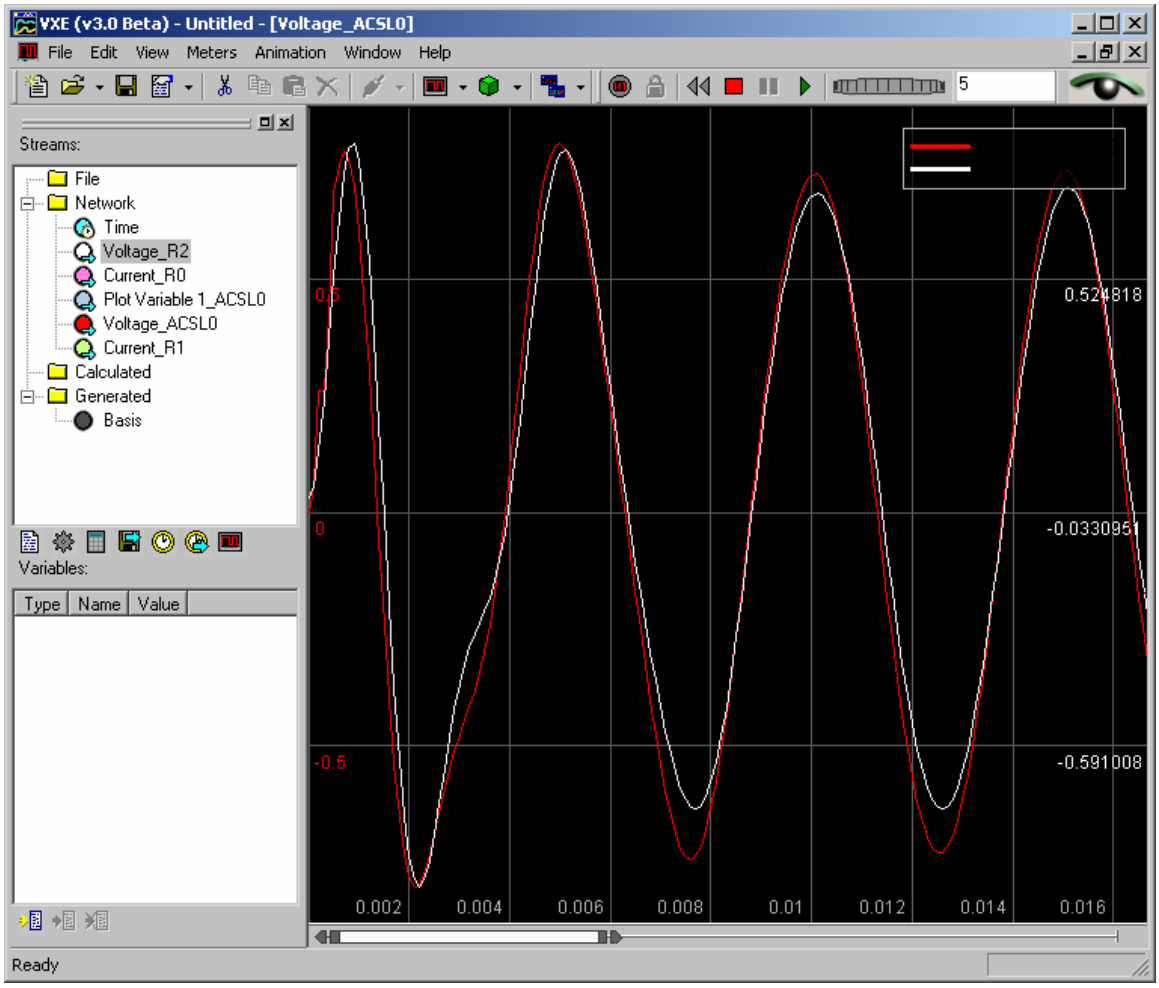
N/A

Example of Model Use



An ACSL model having a capacitive nature is shown in the figure above along with a reference circuit below it, both circuits implement the same system; the ACSL model contains the equivalent of the inductor, capacitor, and resistor on the right of the bottom circuit. In this situation the main state variable driving the connection is the voltage across the capacitor. In this example the ACSL_Entity model is coupled to the system as a current controlled voltage source.

Model Validation



The above plots show the results of the ACSL_Entity circuit and the results of the circuit realized entirely in VTB, they are virtually undistinguishable as the plots the figure above shows. In this figure the upper part reports the results of the ACSL_Entity circuit while the lower scope reports the results of the two simulations superimposed

References

W. McKay, A. Monti, E. Santi and R. Dougal, *A Co-Simulation Approach for ACSL-Based Models*, Huntsville Simulation Conference, Huntsville, AL, October 3-4, 2001.