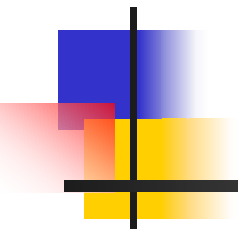
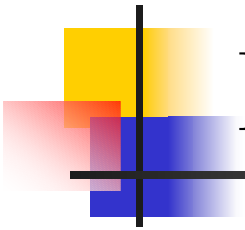


652 homework7
Synopsys Cocentric

Mo Zhang

February, 2005



Data Flow Graph (DFG) Models

- This homework is a starting step towards understanding the functioning of Synopsys Cocentric.
- Data flow graph models are data models in which the instances they contain communicate by means of FIFO queues of data travelling on nets.

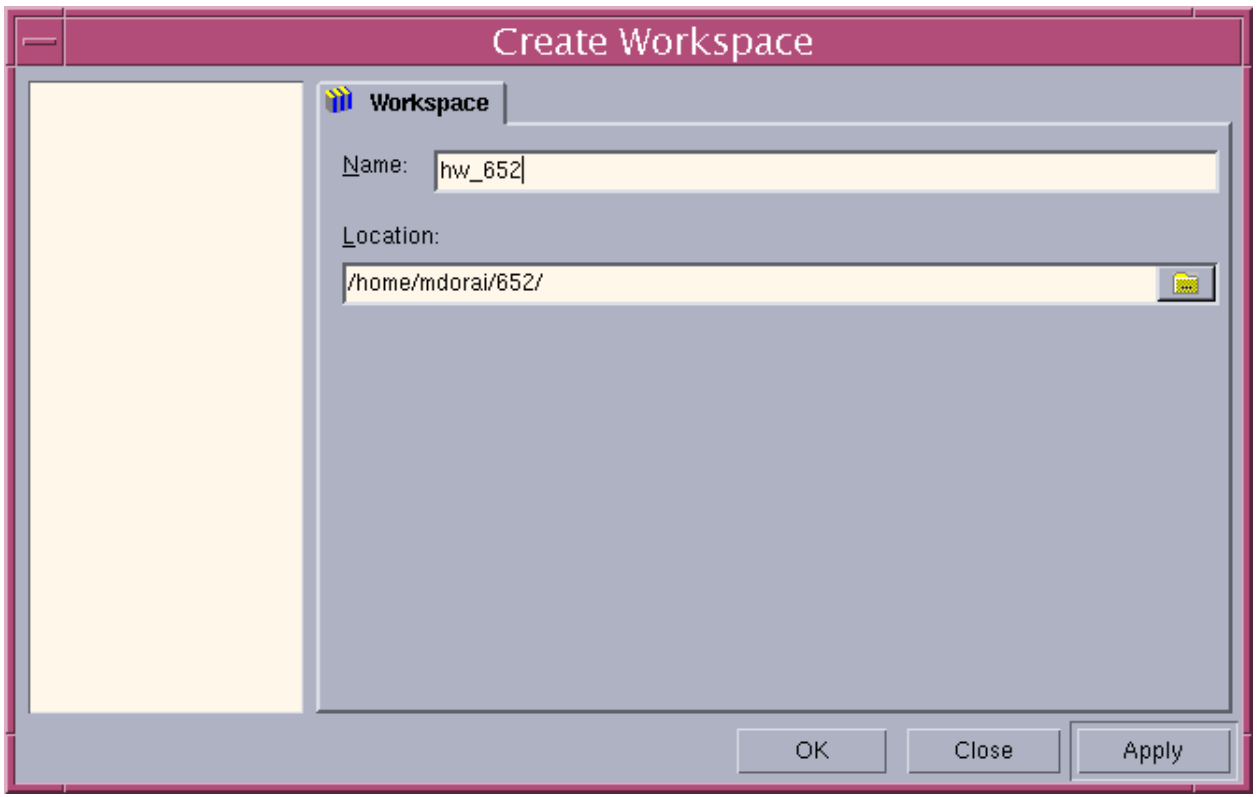
Part A --Creating a Model structure

- source the .cshrc file by typing –

  source ~cad/.cshrc
- To invoke Synopsys tools, type - synopsys_tools
- To start System Studio, enter the following command: ccss &

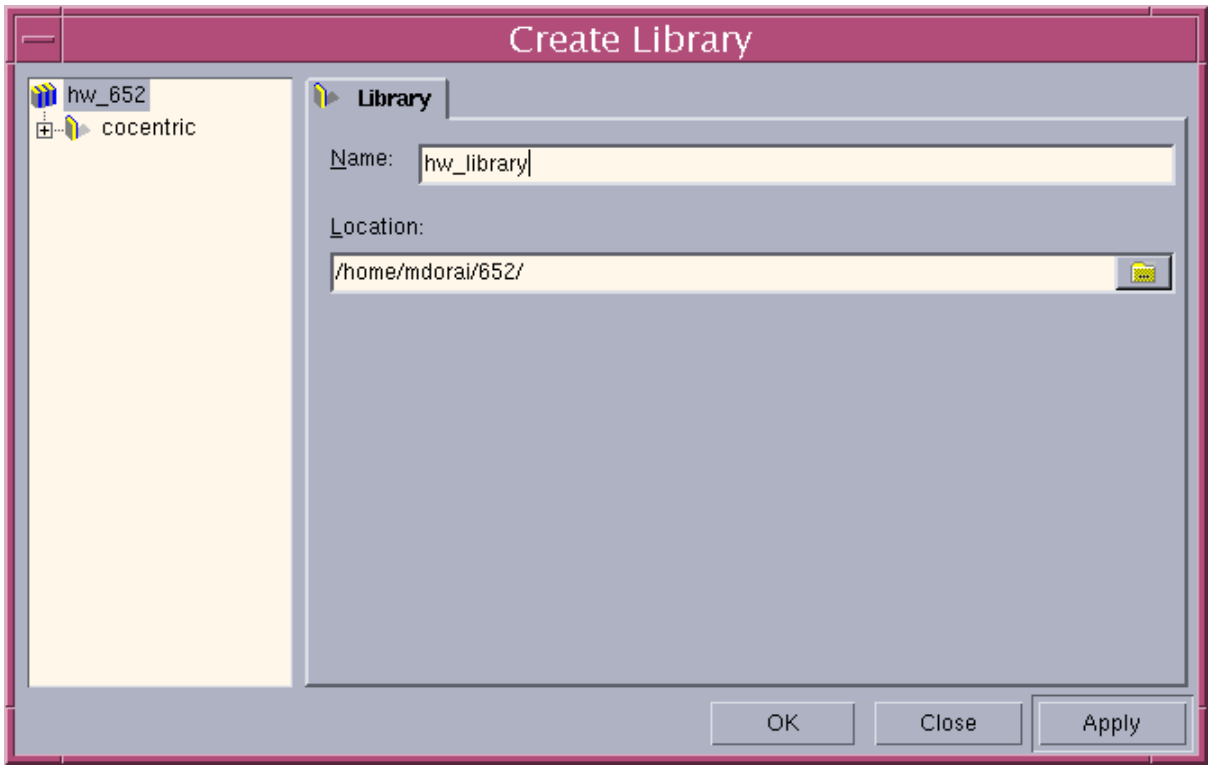
Part A -- Creating a Workspace

Select File --› New from the System Studio main menu bar. The Create Workspace dialog box displayed. Enter the name of the workspace that you wish to create. Click the Apply button. Don't click OK now.



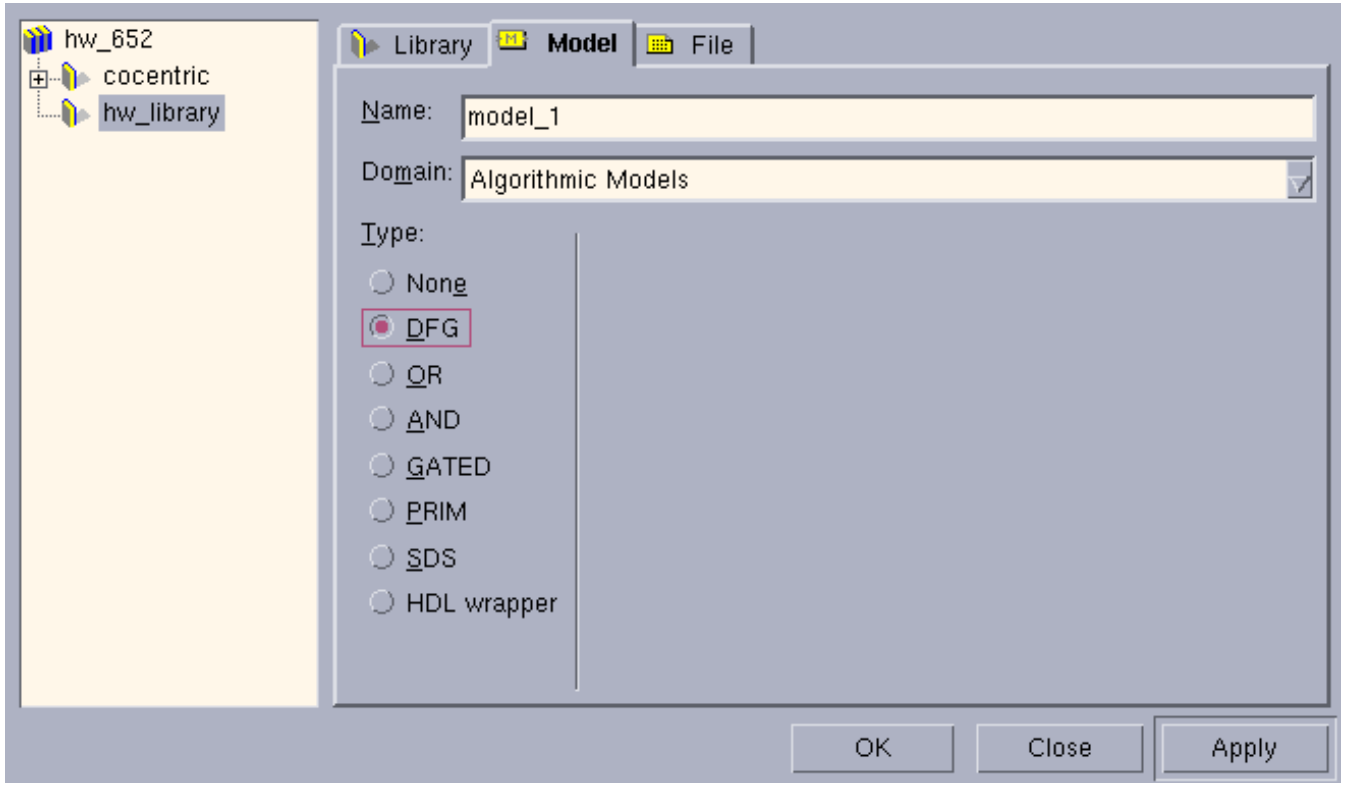
Part A -- Creating a Library

After you say Apply, the same window asks for the library name. Type a library name under the workspace that you have created. You can specify a different location for the library directory in the Location field if you want to. After you enter a library name (or accept the default name), click Apply. Again don't click OK.



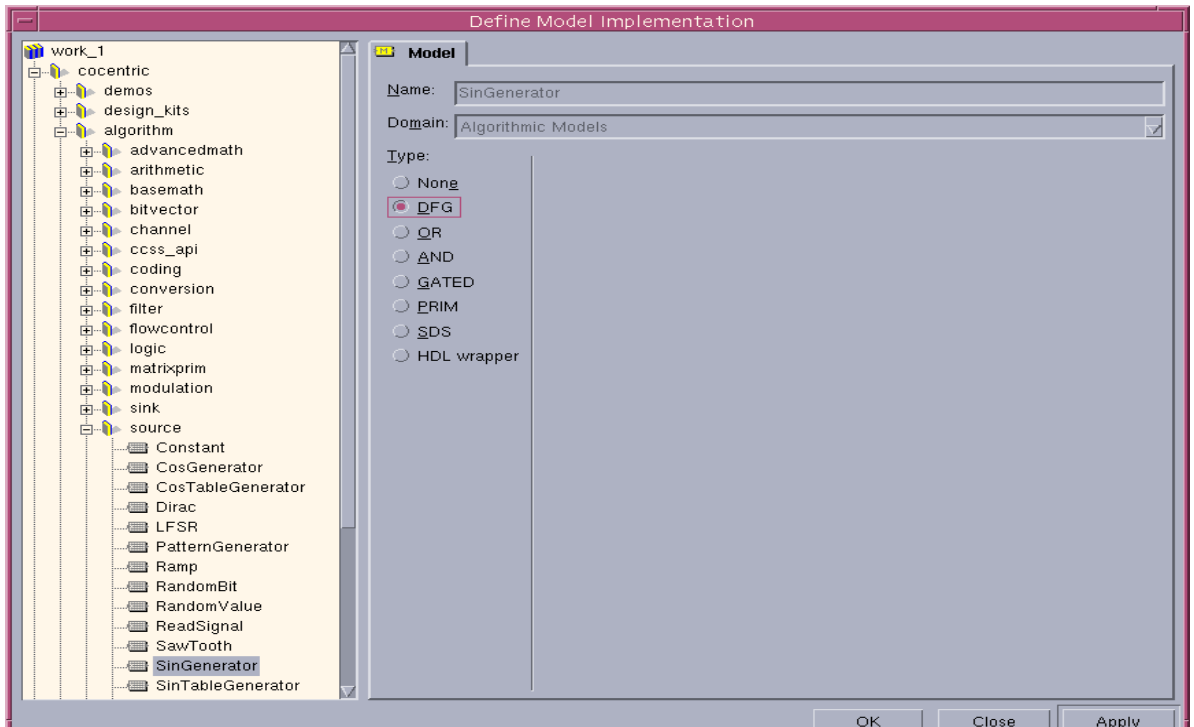
Part A -- Creating a Model

After you have clicked Apply, in the Create Library dialog box, select a library and click the Model tab. The dialog box changes to the Create Model dialog box, as shown in the Figure. If you do not select a library, the Model tab will not be visible. choose the DFG option.



Part A -- Creating a Model

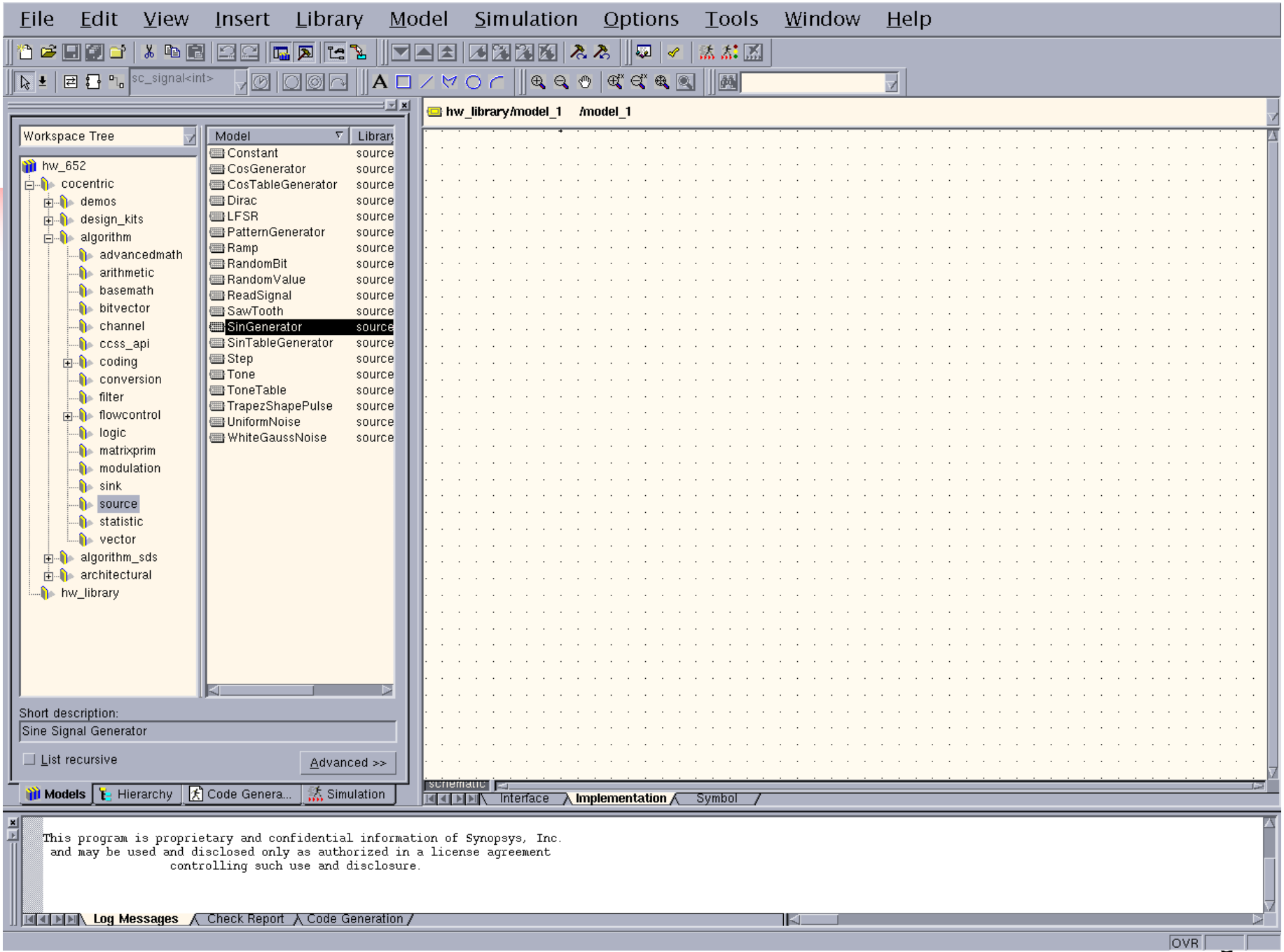
But when I first came to this page, there is no "DFG" option in the "model" frame. So I click the plus sign (+) on the left of "cocentric" to expand the "cocentric" library--> then clicked the plus sign (+) on the left of the “algorithm” library --> then clicked the plus sign (+) on the left of the “source” library-->then clicked on the "SinGenerator". The "DFG" option appeared in the "model" frame. When I click my own library , "hw_library", there will be the "DFG" option in the "model" frame.



Part A -- Creating a Model

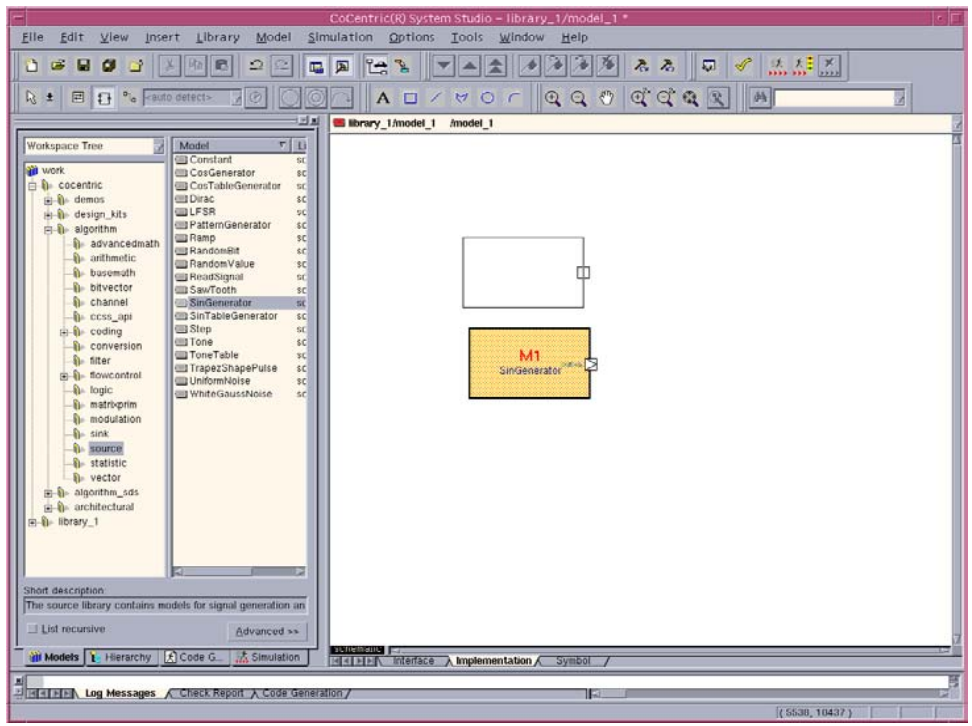
- Now, you click Apply and then OK.
- The DFG model that we are going to create is a simple model that consists of two blocks namely -
  1. A sine wave generator &
  2. A sink.

Both are existing models contained in the System Studio libraries. To create the model schematic, 1. If the “cocentric” library is collapsed, expand the library by clicking the plus sign (+) next to it in the Workspace window; expand the “algorithm” library and then select the “source” library.


File Edit View Insert Library Model Simulation Options Tools Window Help
sc_signal<int>
Workspace Tree
hw_652
cocentric
demos
design_kits
algorithm
advancedmath
arithmetic
basemath
bitvector
channel
ccss_api
coding
conversion
filter
flowcontrol
logic
matrixprim
modulation
sink
source
statistic
vector
algorithm_sds
architectural
hw_library
Model
Library
Constant source
CosGenerator source
CosTableGenerator source
Dirac source
LFSR source
PatternGenerator source
Ramp source
RandomBit source
RandomValue source
ReadSignal source
SawTooth source
SinGenerator source
SinTableGenerator source
Step source
Tone source
ToneTable source
TrapezShapePulse source
UniformNoise source
WhiteGaussNoise source
Short description:
Sine Signal Generator
List recursive
Advanced >>
Models
Hierarchy
Code Genera...
Simulation
hw_library/model_1 /model_1
Interface
Implementation
Symbol
This program is proprietary and confidential information of Synopsys, Inc.
and may be used and disclosed only as authorized in a license agreement
controlling such use and disclosure.
Log Messages
Check Report
Code Generation
OVR

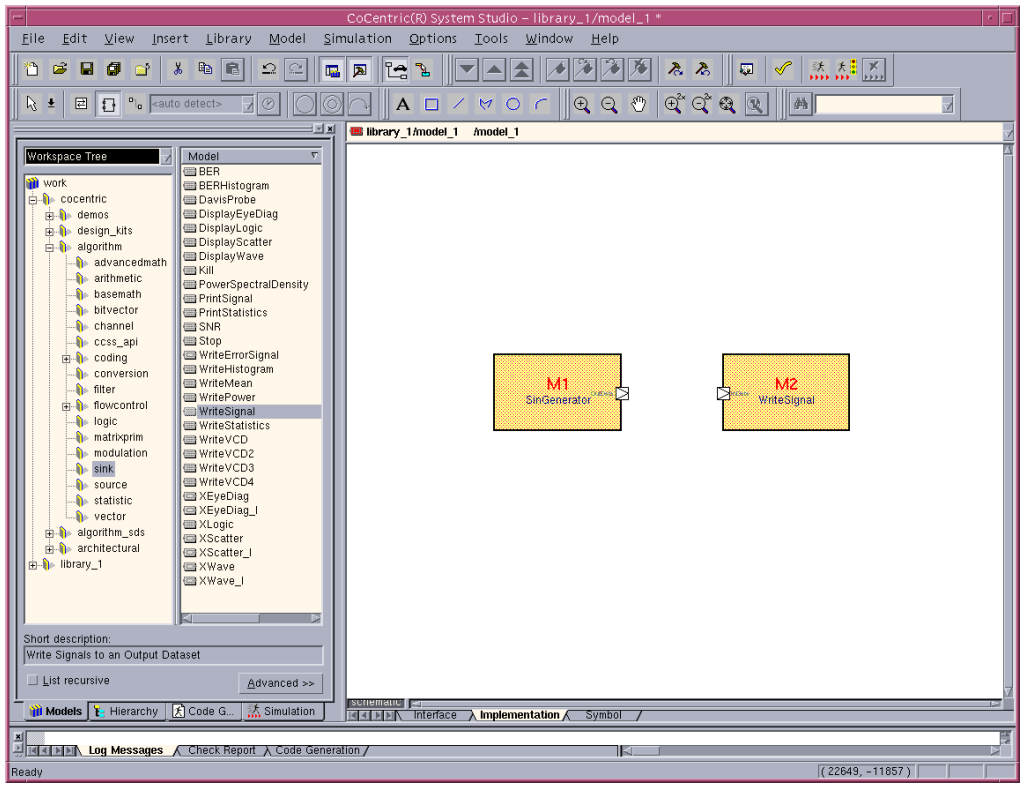
Part A -- Adding the SinGenerator to the Implementaion window

Click the "Implementation" frame. Otherwise, the insert Instance button does not work. Click "Insert" at the top of the window-->select "Instance". Select the SinGenerator model from the “source” library located in the algorithm library. Move the cursor into the design area. You will see the outline of the block displayed as you move the cursor around. Click the left mouse button when the outline of the block is positioned where you want to place the block. Click the middle button of the mouse to disable the insert instance option.



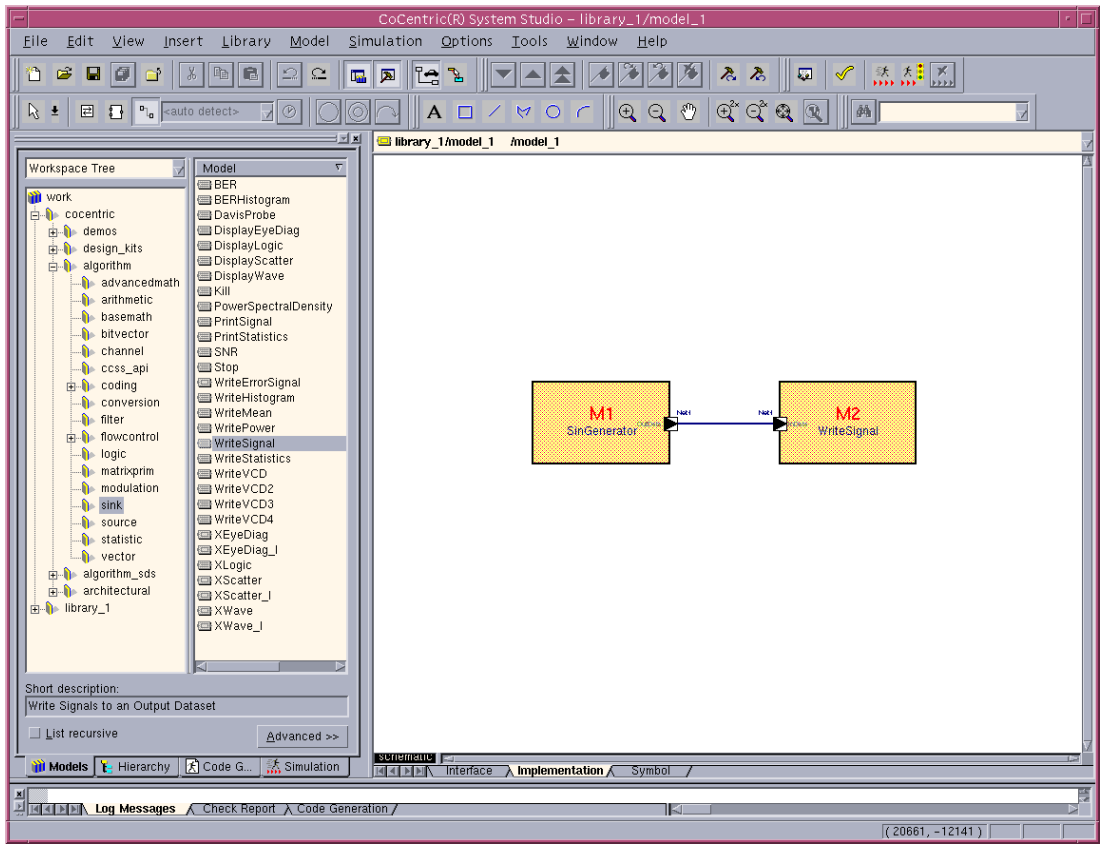
Part A -- Inserting the sink or the Write signal block

Select the WriteSignal block from the System Studio models “sink” library located in the algorithm library. Position the WriteSignal block to the right of the SinGenerator block, as shown in the figure and click the left mouse button. Click the middle mouse button to cancel the insert Instance function.



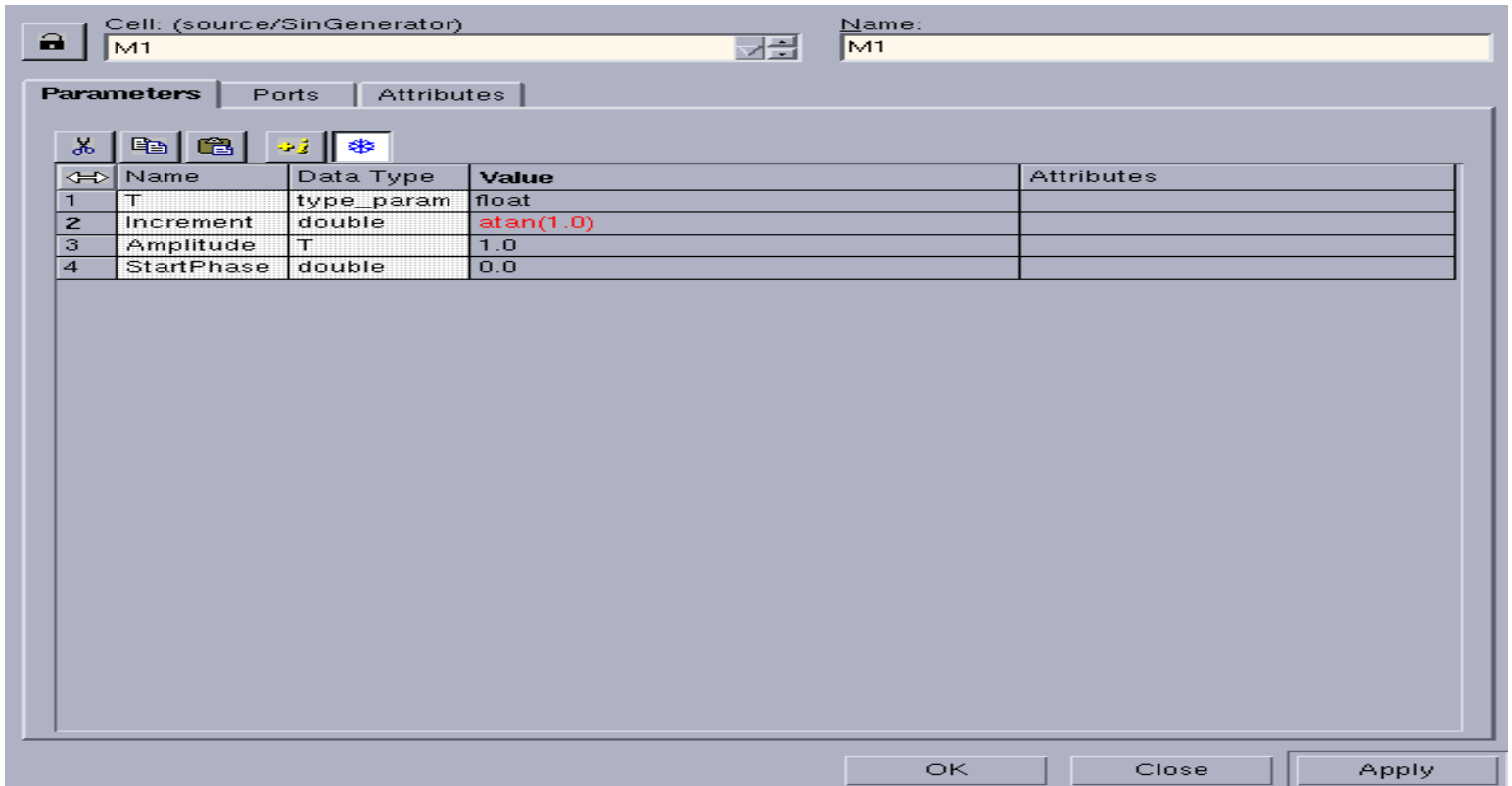
Part A – Connecting the two blocks by a net

Click the Insert Net button in the Schematic toolbar. Position the cursor over the output port of the SinGenerator block. Press and hold the left mouse button, and create a net by dragging a line to the input port of the WriteSignal block. Release the mouse button. Click the middle mouse button to cancel the Insert Net function.



Part A – Set the parameters of the blocks

To finish the design, the blocks have to be parameterized. Position the mouse pointer over instance M1 (the SinGenerator model) and click the right mouse button. Choose Configure Object from the context-sensitive menu. The Configure Objects dialog box is displayed. Assign the expression atan(1.0) to the parameter “Increment”, and click OK. The schematic design is now complete.



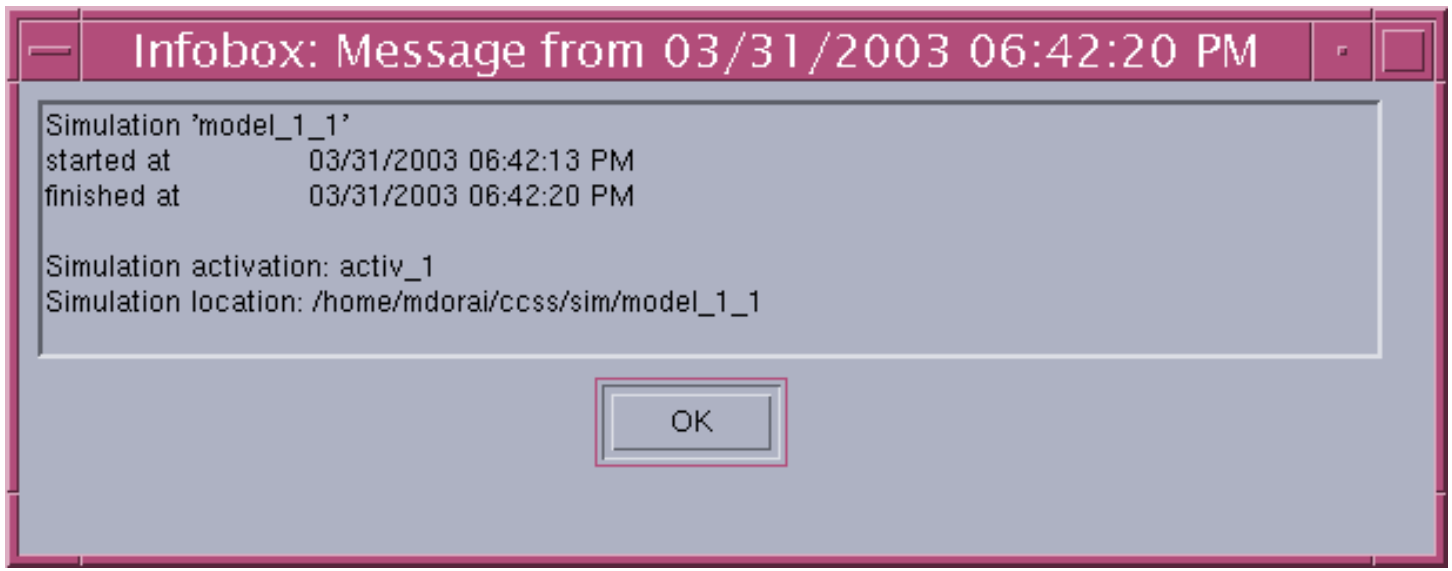
Part A – Simulating the models

You can create the executable simulation either automatically or manually. We will be using the **Cocentric data visualization tool (DAVIS)** to enable us to visually analyze and graphically display data.

Starting DAVIS - Select -->Tools-->DAVIS. This opens the DAVIS tool.

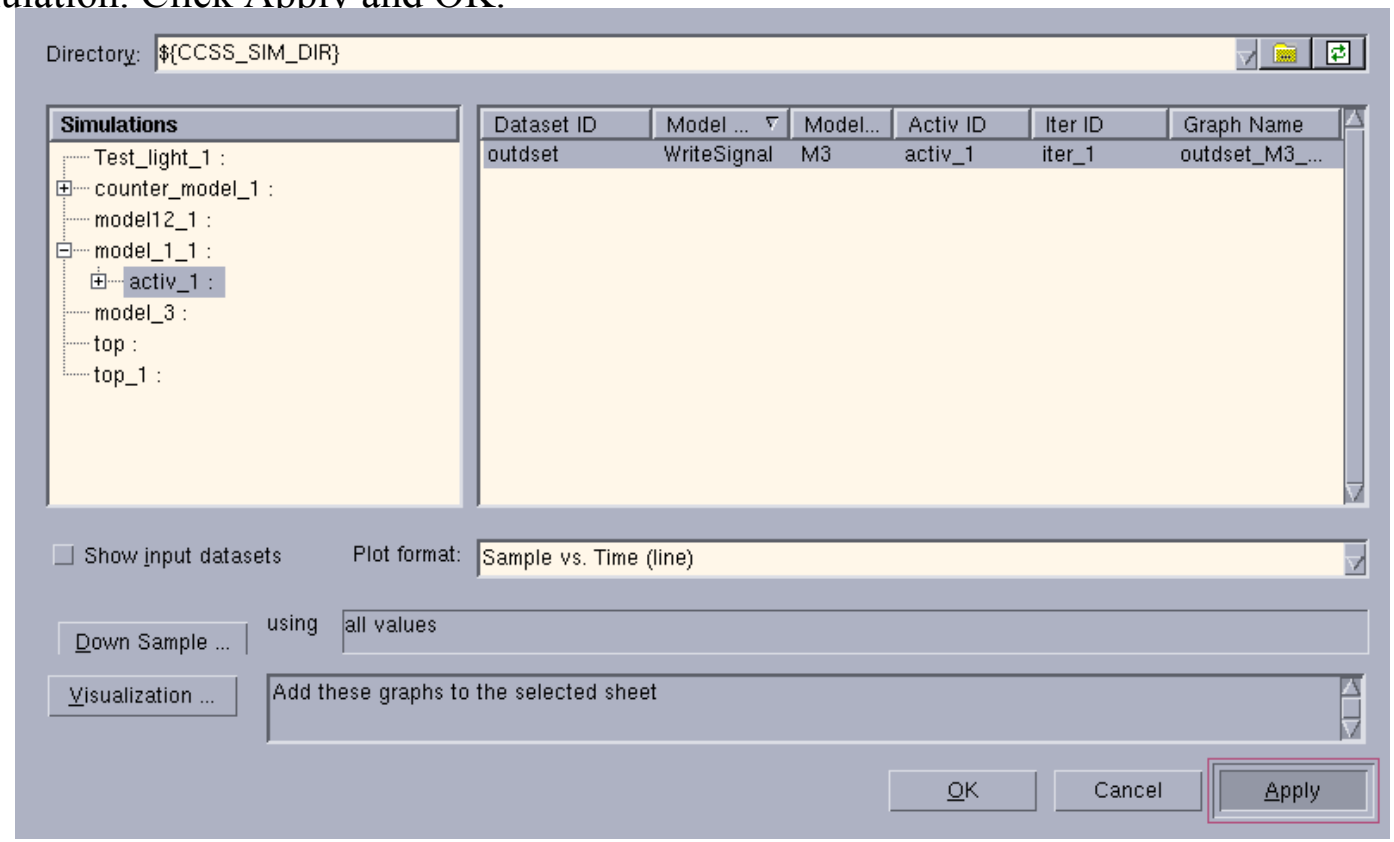
Go back to the Cocentric System Studio Window and select --> Simulation-->Simulate Model. All the steps will be performed automatically.

After a few seconds, you will get a message box as shown in the figure. Click OK and proceed to the DAVIS window.



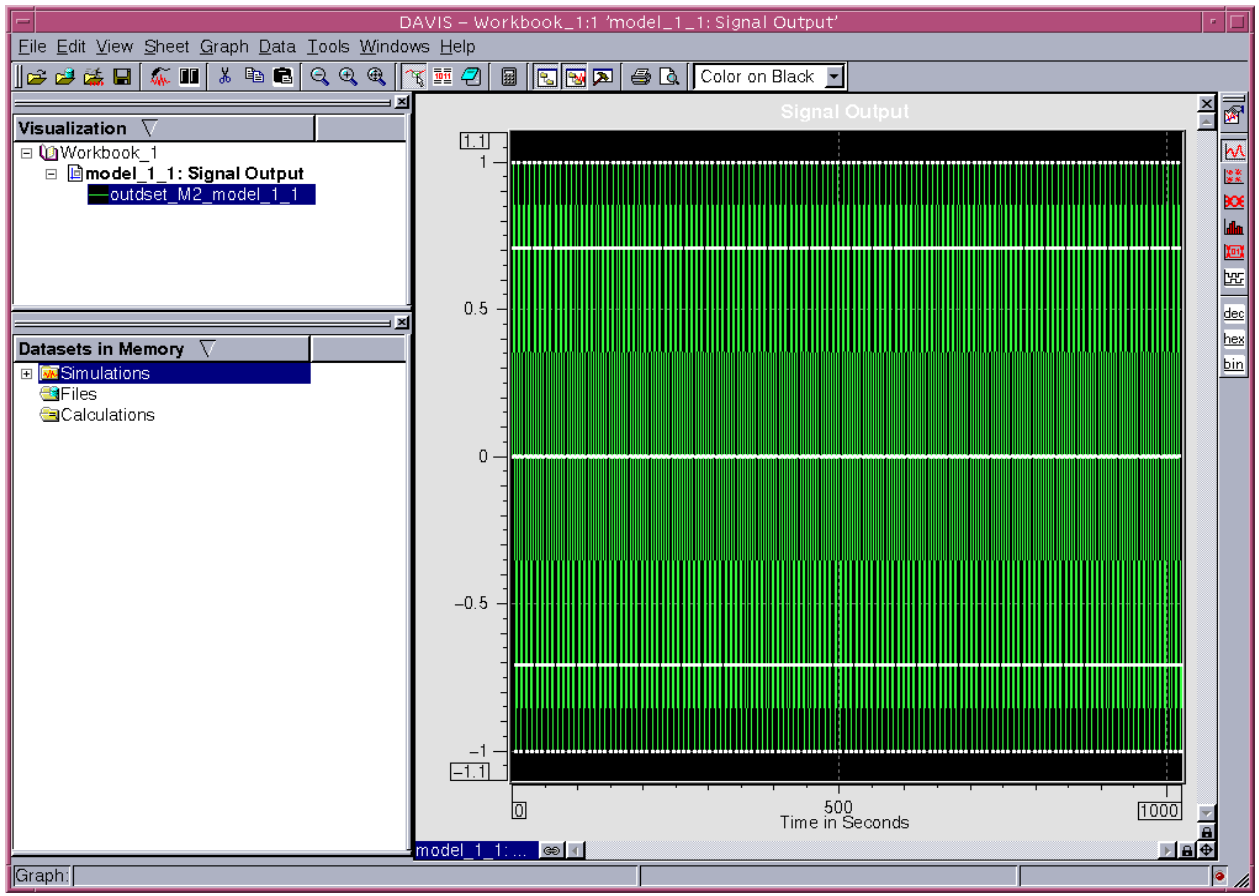
Part A – Linking DAVIS and the earlier run Simulation

Now in the "DAVIS" work window, select -->File-->Open Simulation. Choose the model from the list of running or completed simulations. Make sure that you have selected the active simulation. Click Apply and OK.

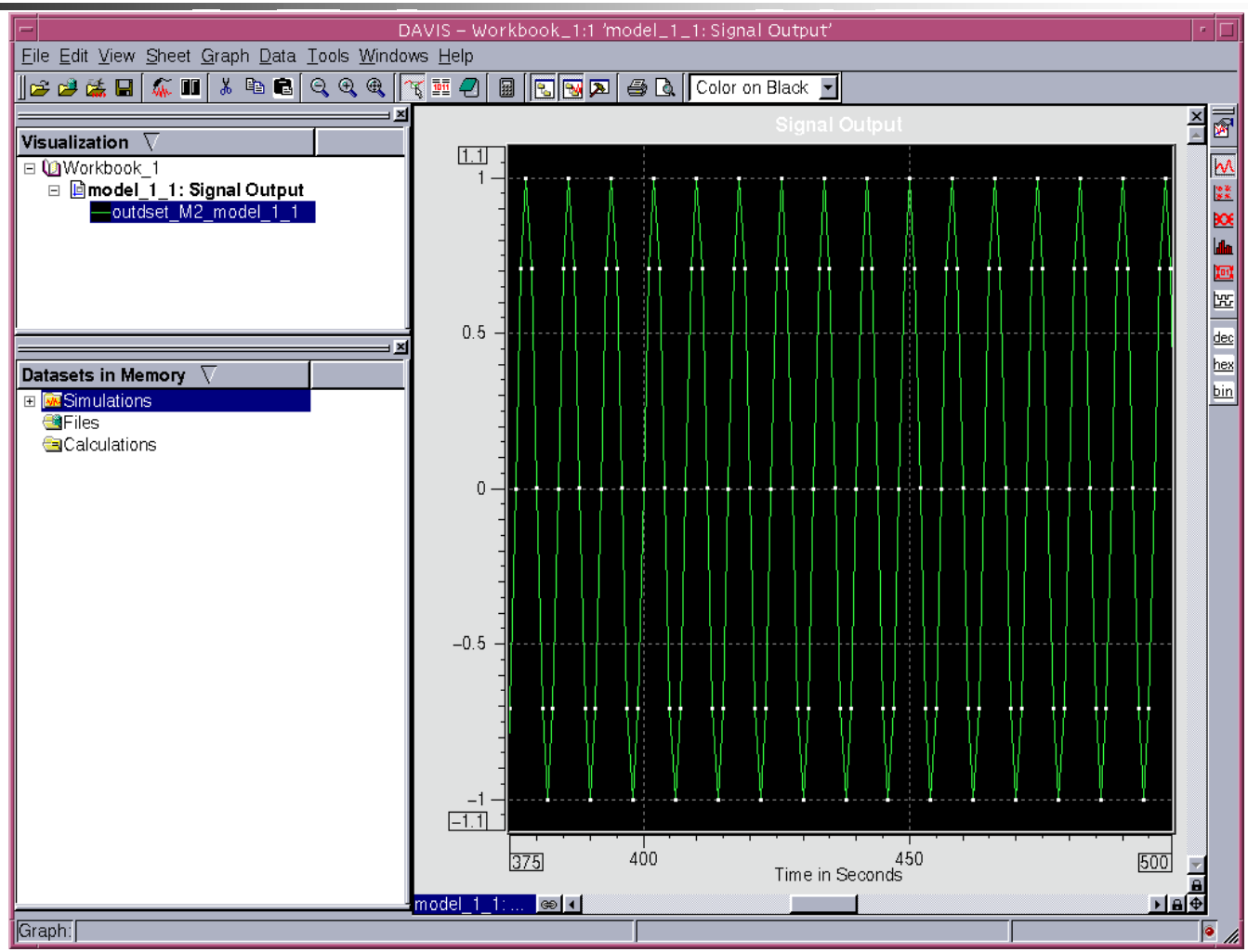


Part A – Viewing the Simulation Output

You may choose to view the waveform on a smaller scale by selecting --View-->Zoom Area--> and giving suitable values.



Part A – Viewing the Simulation Output

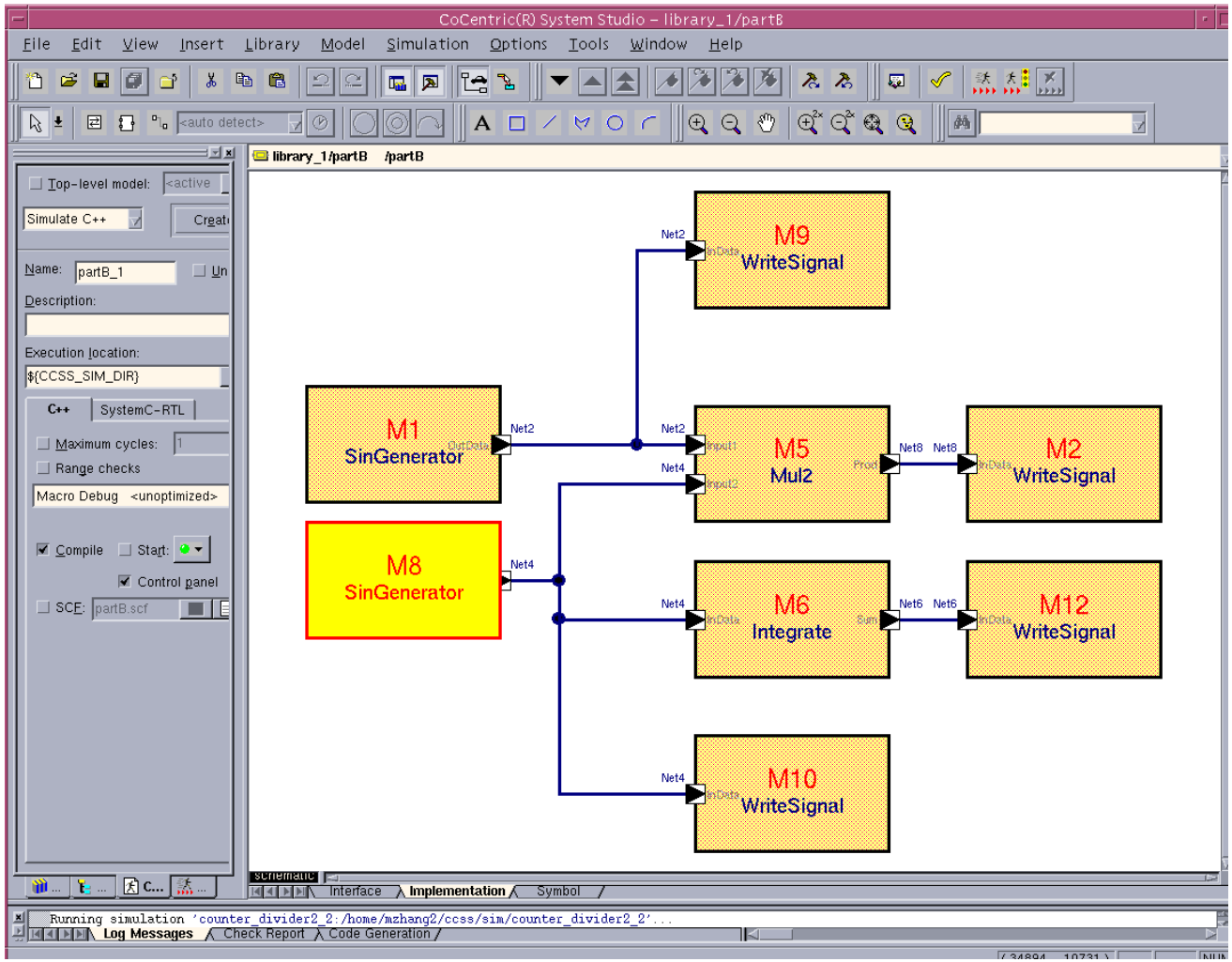


Part A – Viewing the Simulation Output

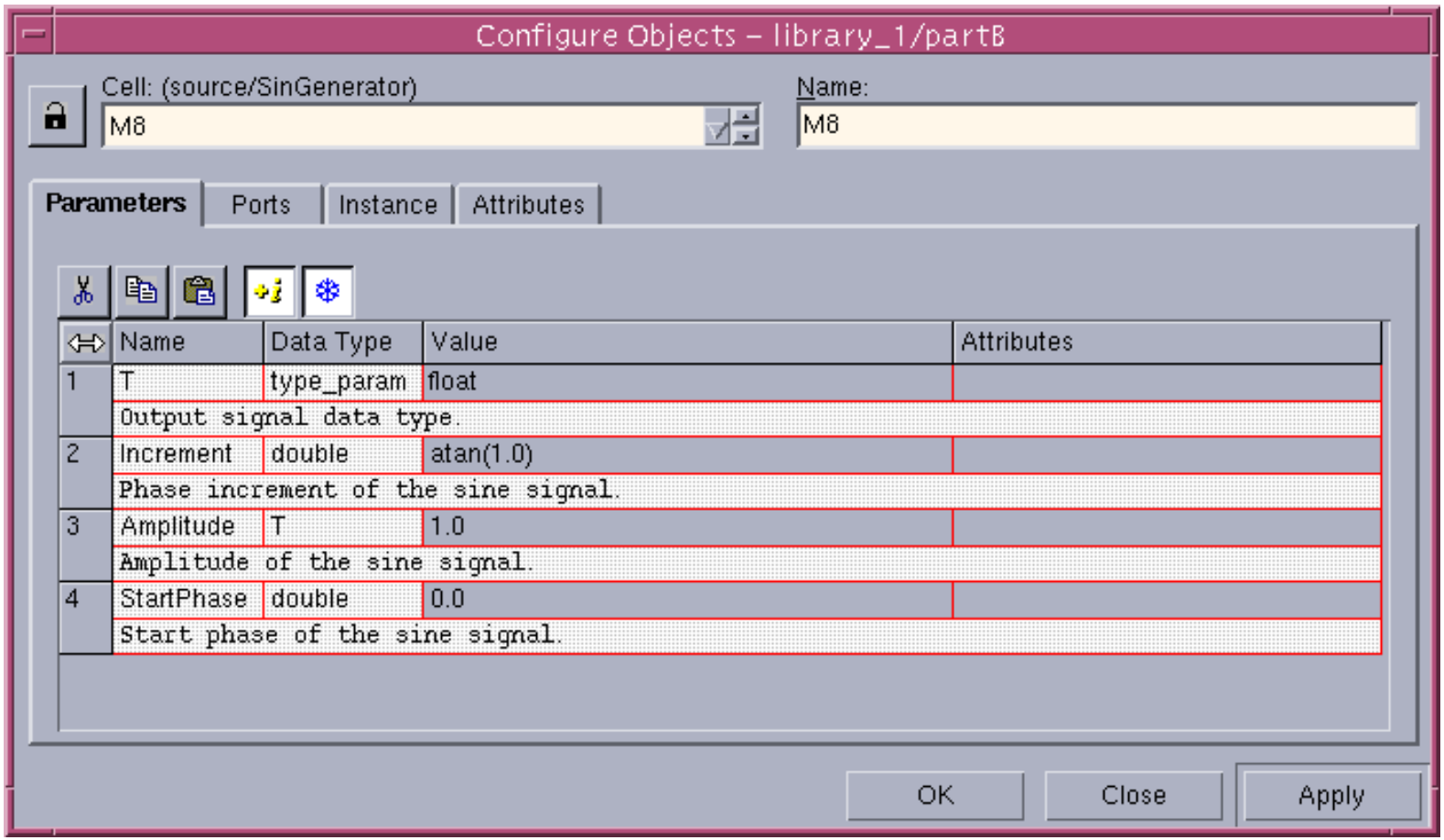
- If you want to create a new workspace, you first have to close the exisitng workspace by choosing--> Select-->File-->close workspace.

- If you want to reopen your existing workspace, choose Select-->File-->Open workspace--> click the "*.ssw", your workspace file.

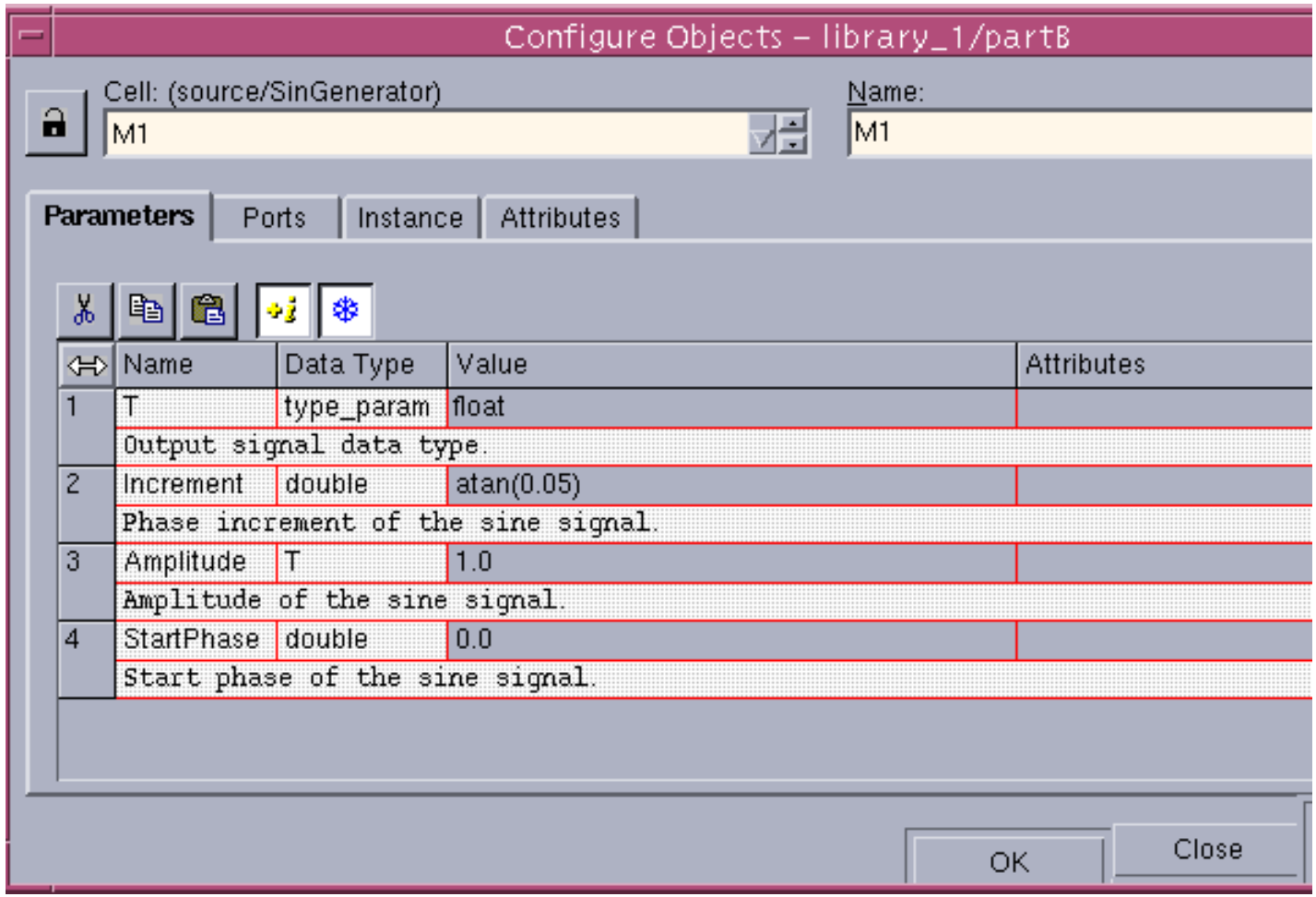
Part B-- The schematic of multiplying and integrating circuits.



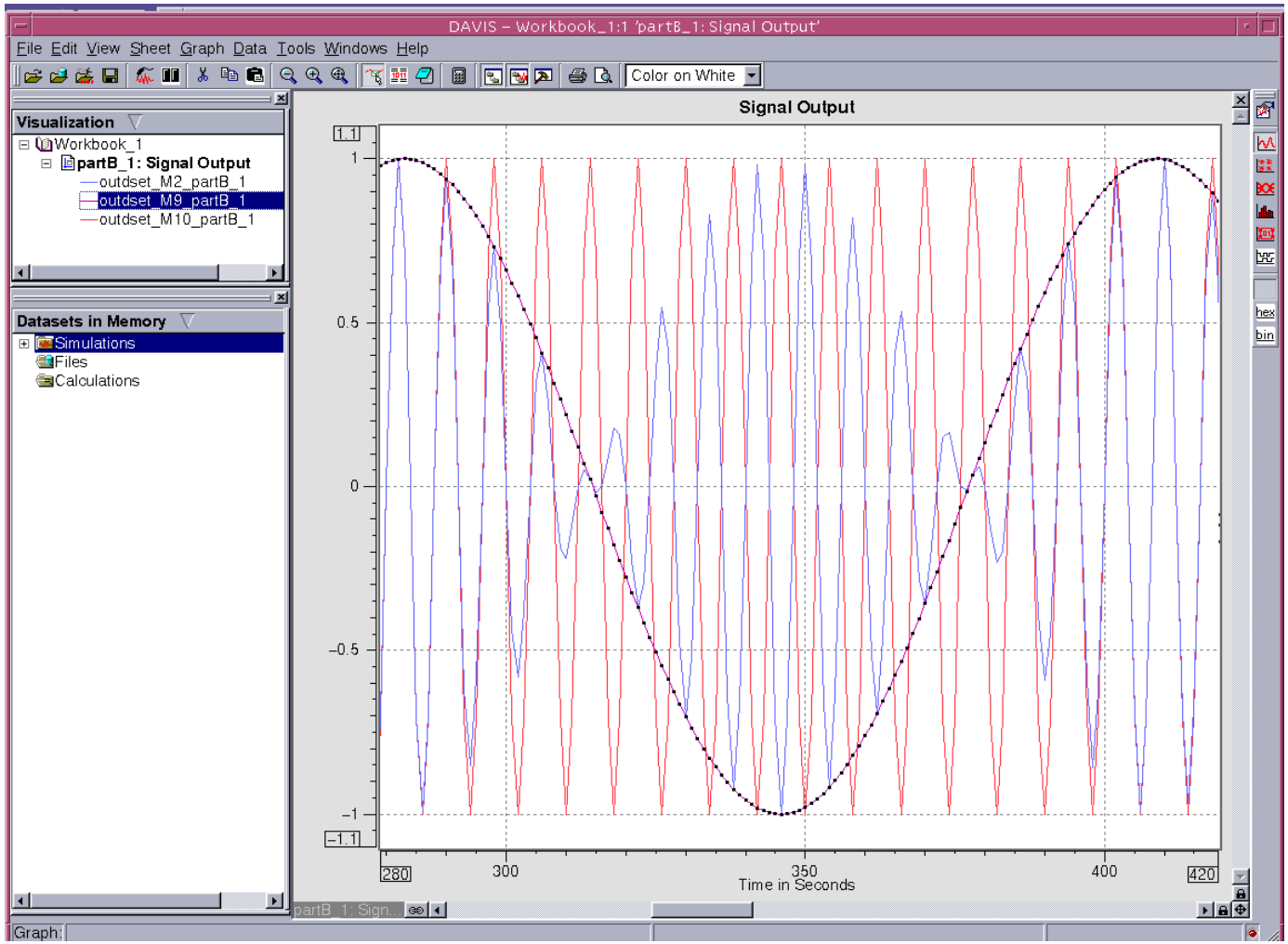
Part B–
Configure of the Fast SinGenerator



Part B–
Configure of the Slow SinGenerator



Part B– Simulation of the Multiplier

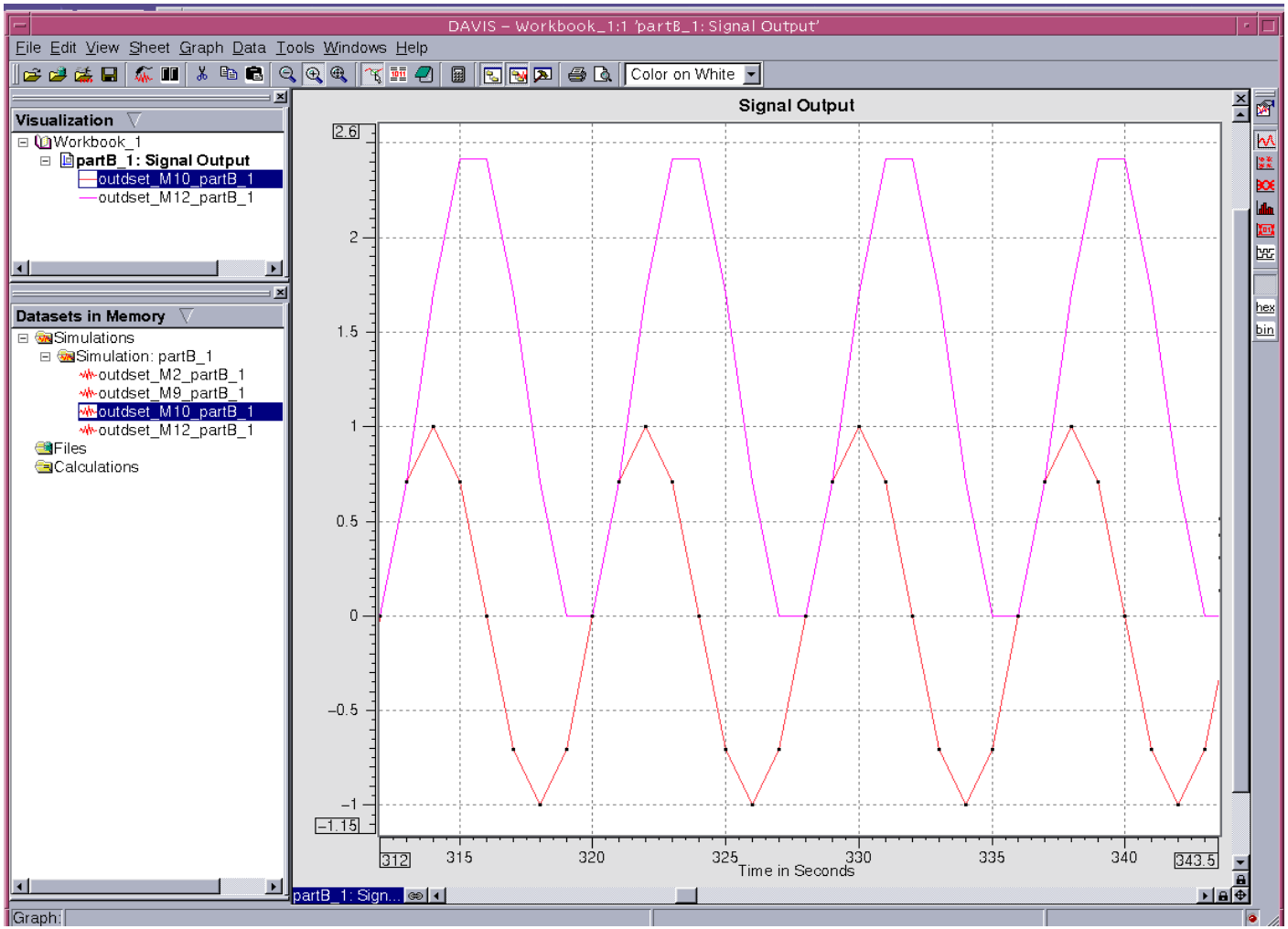


Part B– Simulation of the Integrator

$$-\sin(x) = \frac{d}{dx}\cos(x)$$

$$\int_0^t \sin(x)dx = -\cos(x)\Big|_0^t = -[\cos(t) - \cos(0)] = -\cos(t) + 1$$

Part B– Simulation of the Integrator



Thank you! ☺