Introduction to Xcos

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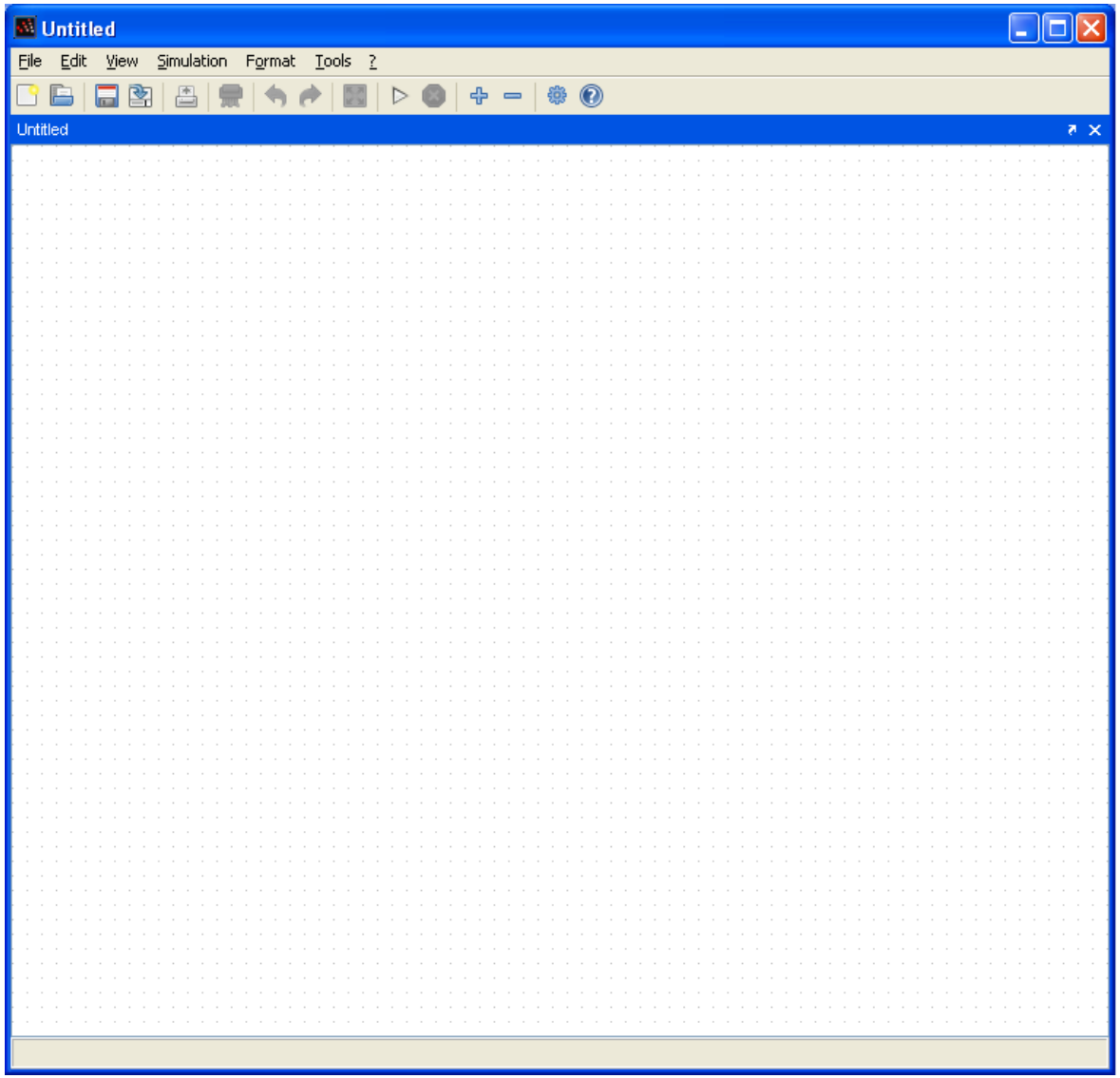
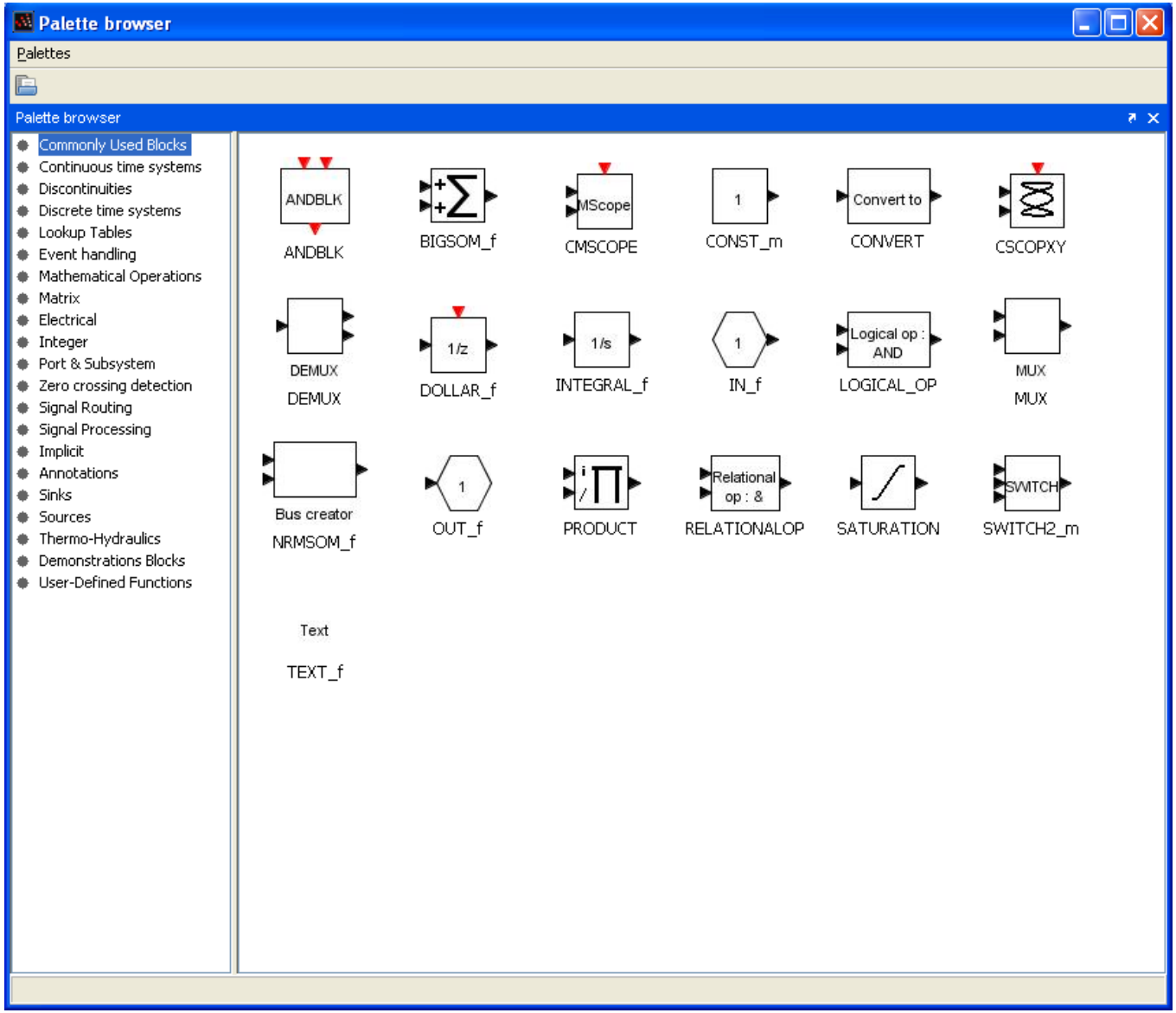
What is Xcos?

- A Scilab connected object simulator
- Used for block diagram simulation
- Excellent GUI for Data processing

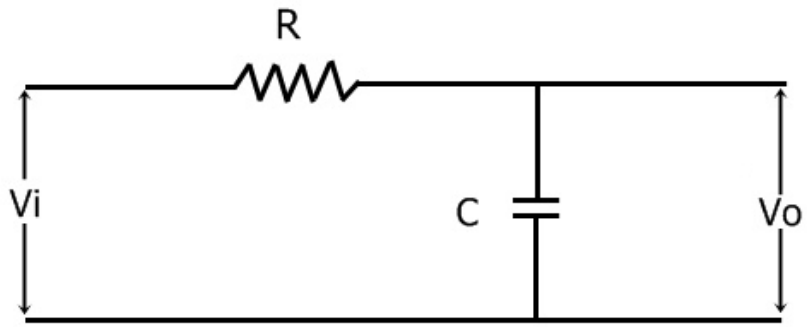
Xcos window



Xcos palette browser

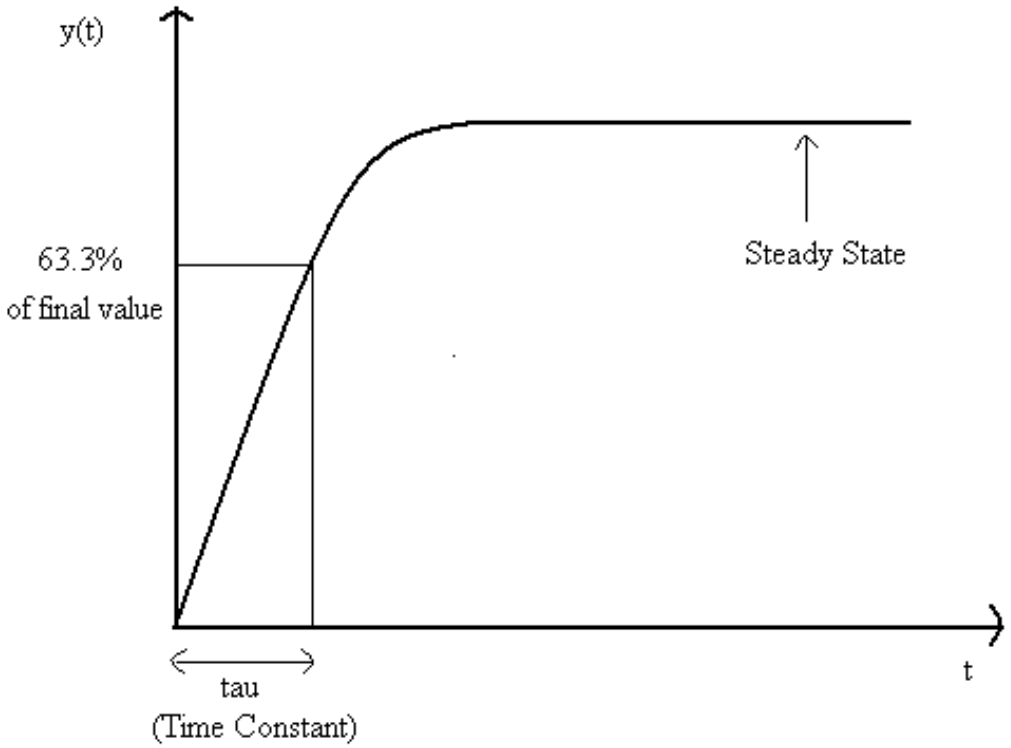


First order Systems

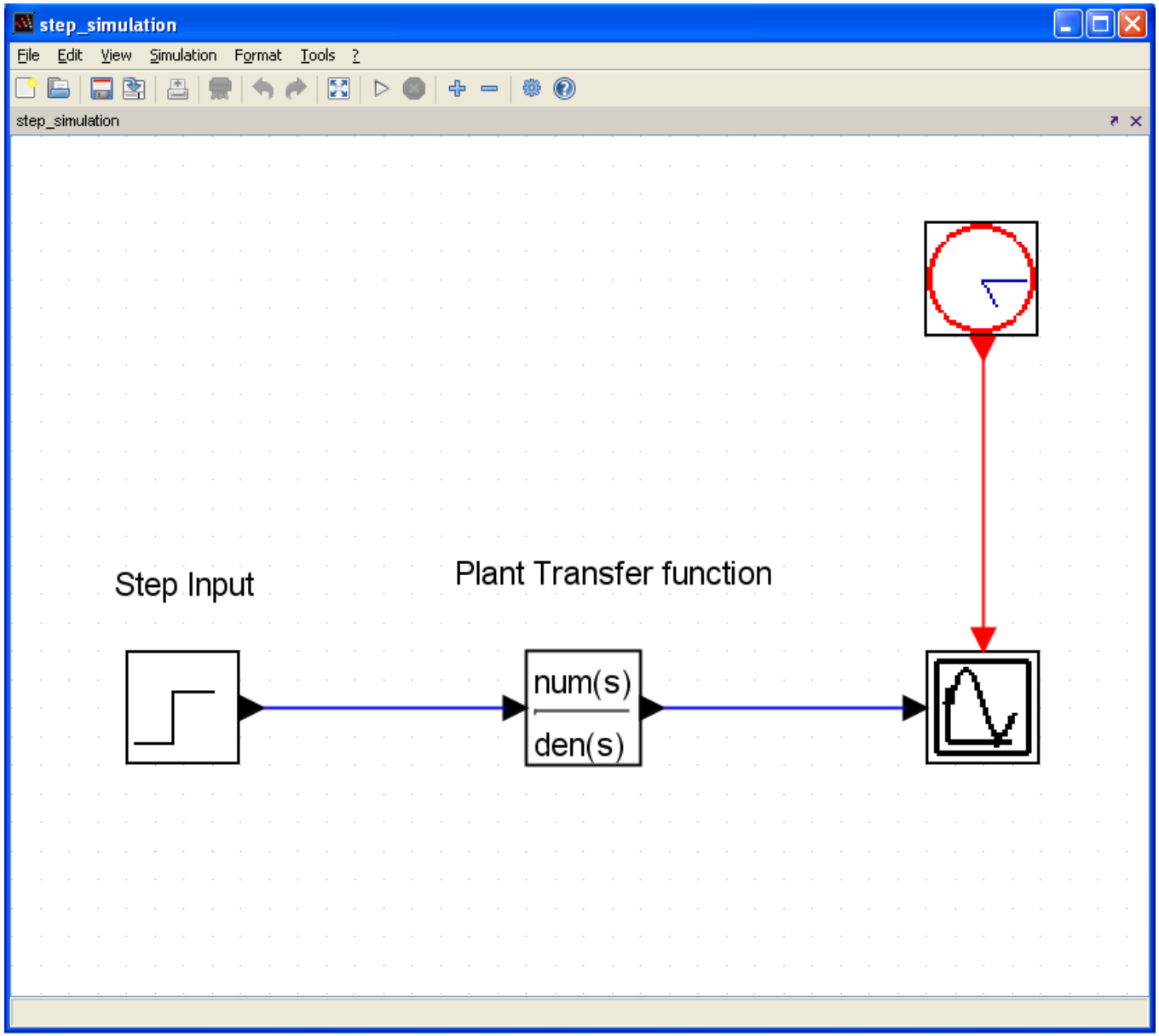


$$\frac{V_o(s)}{V_i(s)} = \frac{1}{RCs + 1}$$

Step response of 'First order Systems'

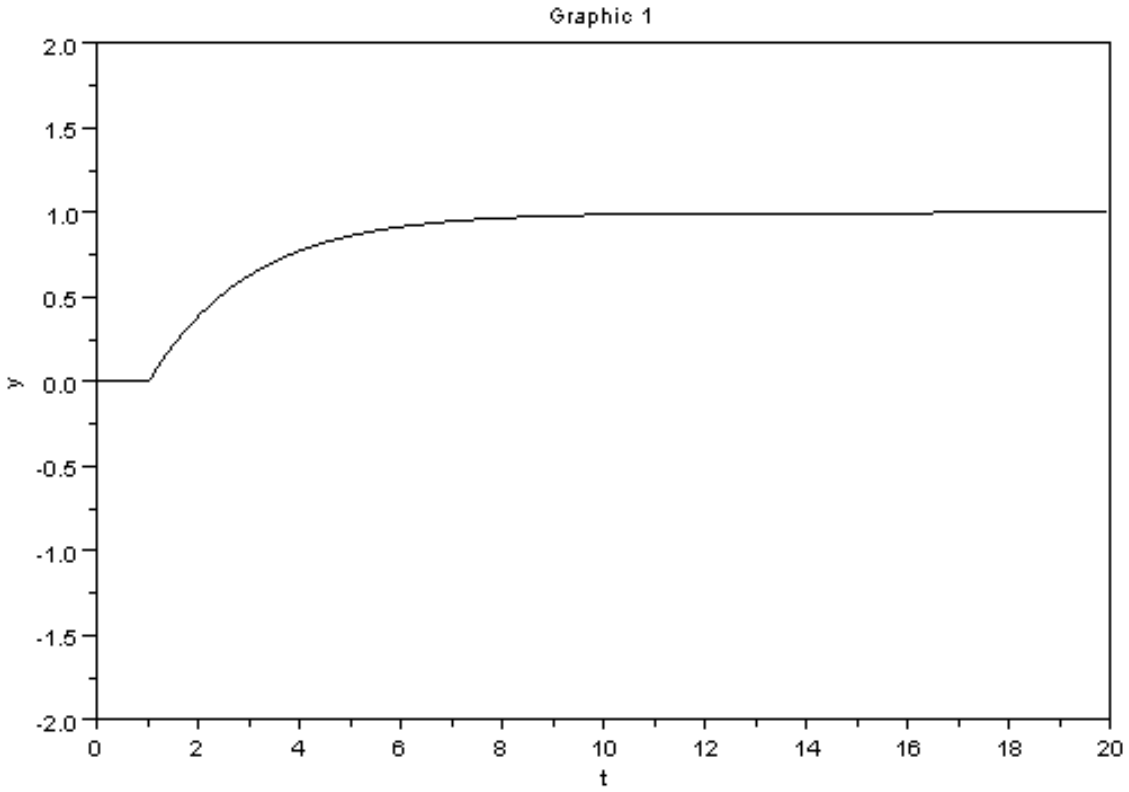


Xcos for open loop simulation (first order)

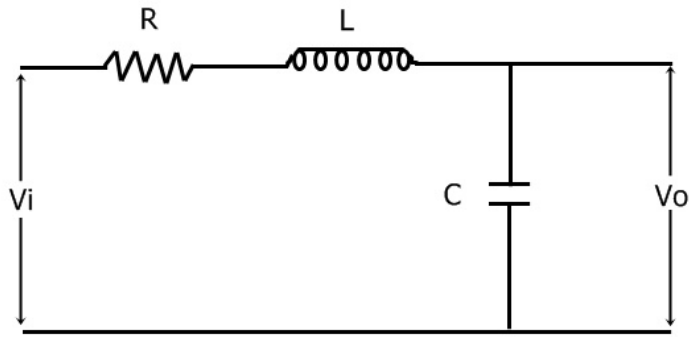


Xcos Response for open loop simulation

Xcos simulation response for Transfer function $\frac{1}{2s+1}$



Second order Systems

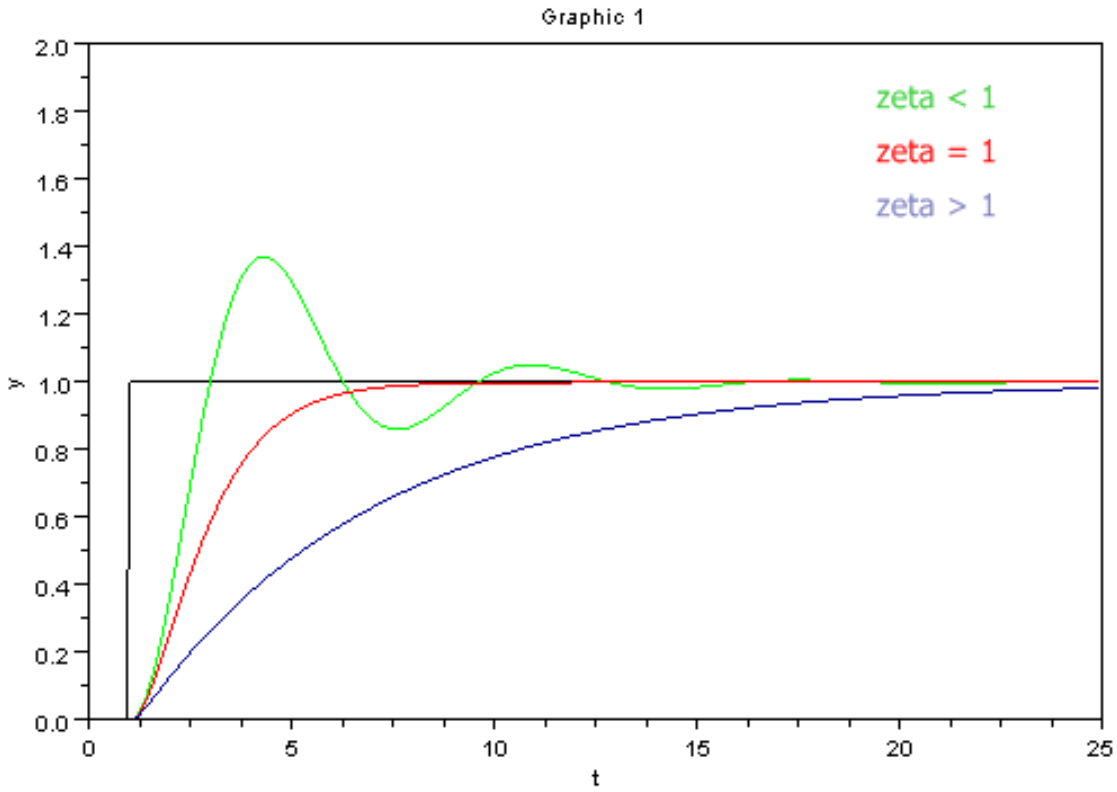


$$\frac{V_o(s)}{V_i(s)} = \frac{1}{s^2 + LCs + 1}$$

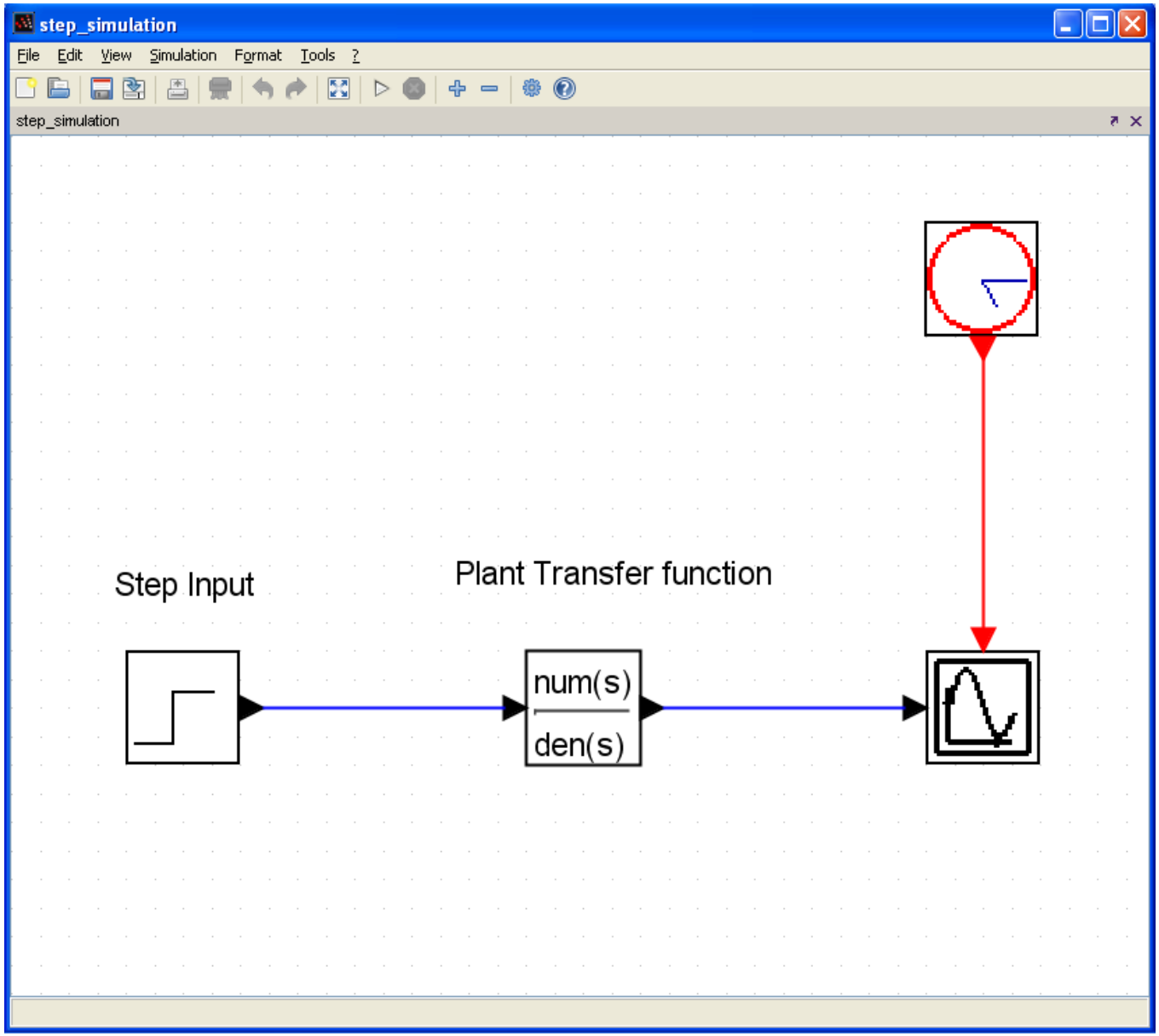
This second order transfer function can also be written in terms of ω_n,undamped natural frequency and ζ ,damping ratio.

$$\frac{C(s)}{R(s)} = \frac{\omega_n}{s^2 + 2\zeta\omega_n s + \omega_n^2}$$

Step response of 'Second order Systems'

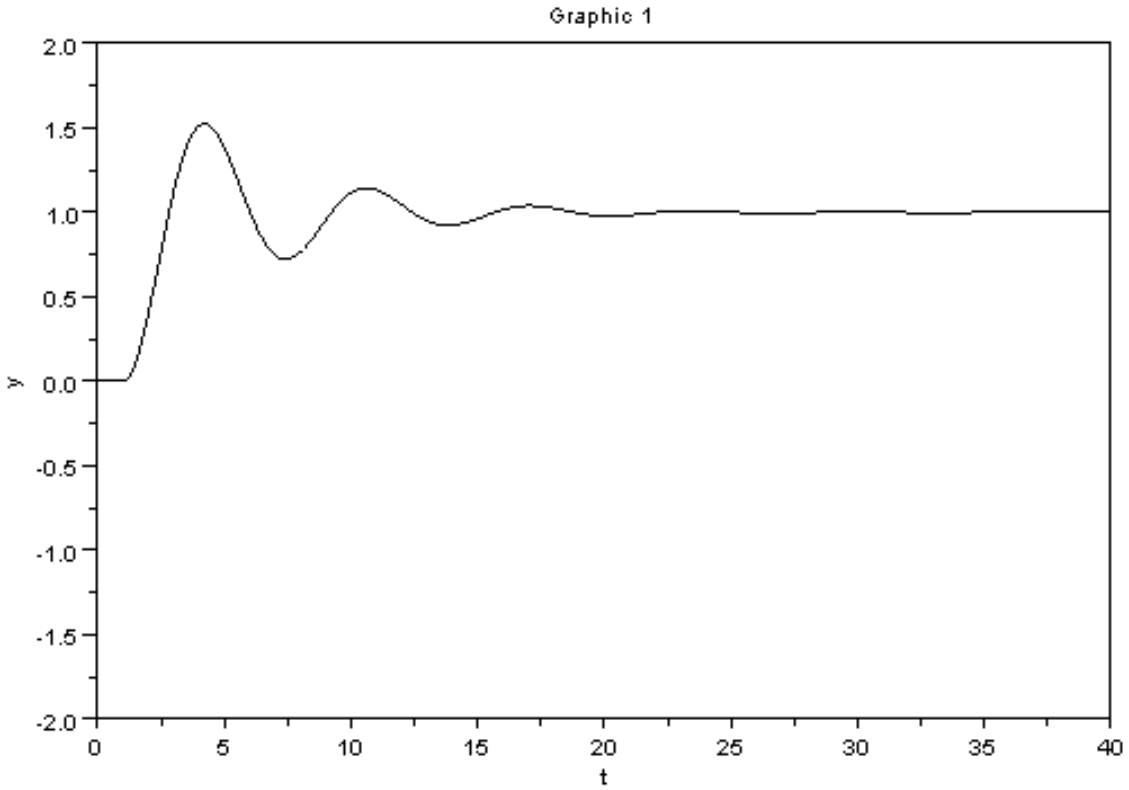


Xcos for open loop simulation (second order)



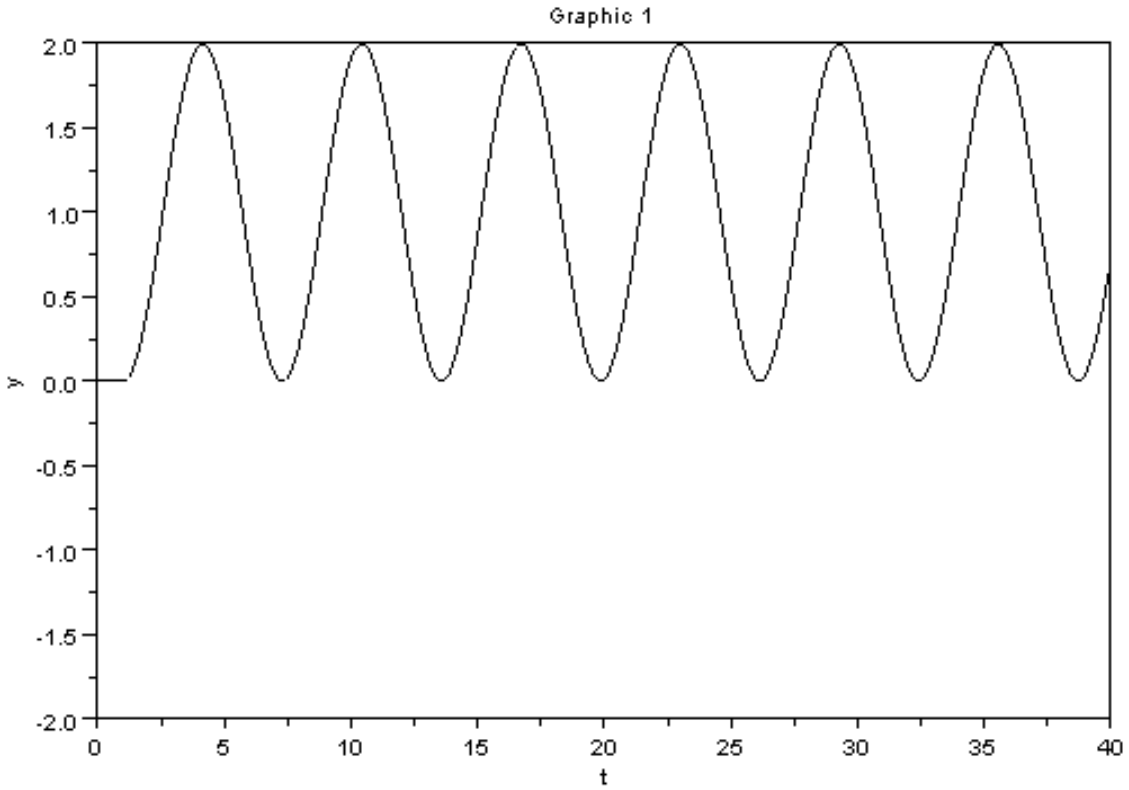
Xcos Response for open loop simulation

Xcos simulation response for Transfer function $\frac{1}{s^2+2*0.2*1*s+1}$

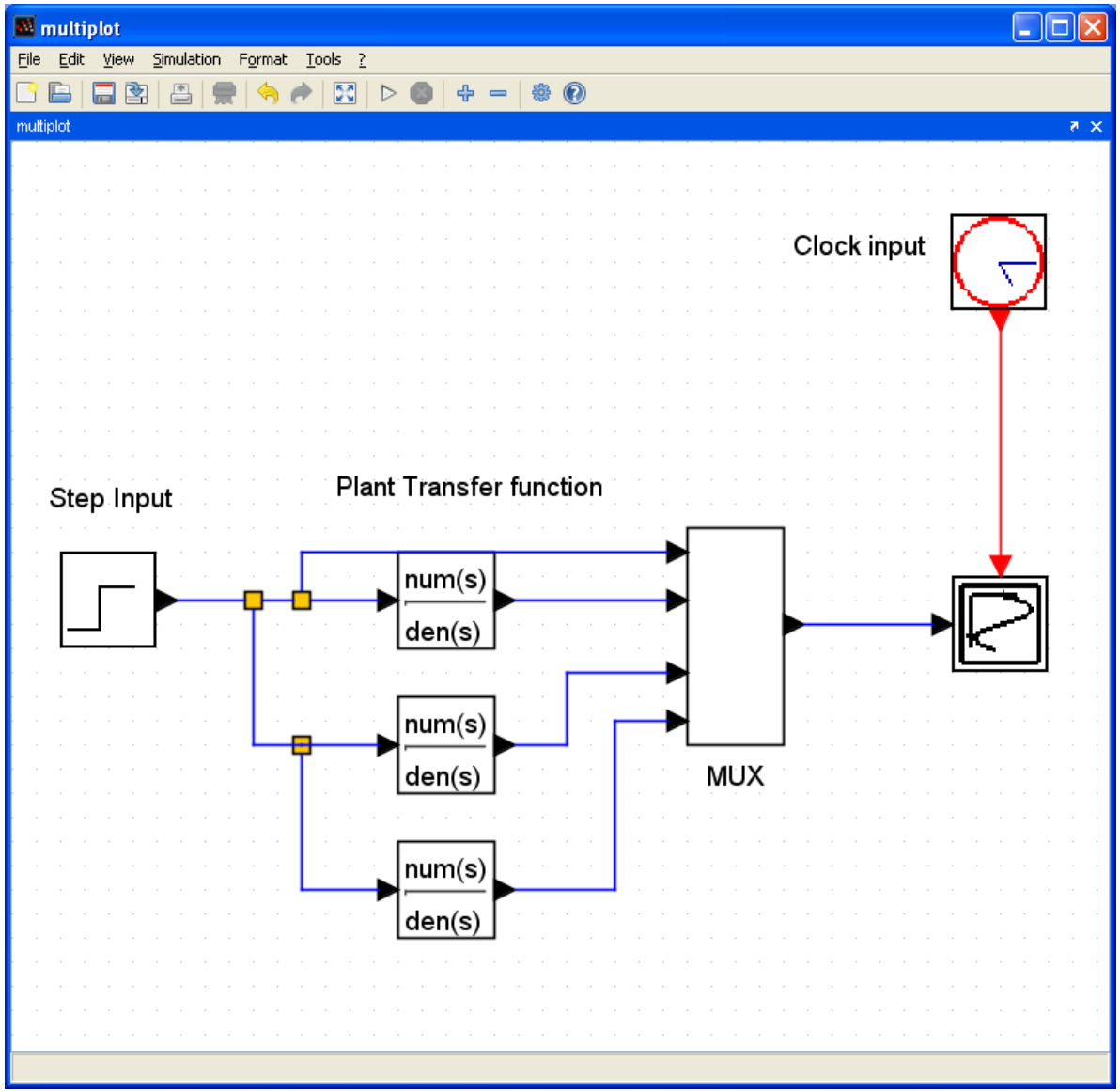


Xcos Response for open loop simulation

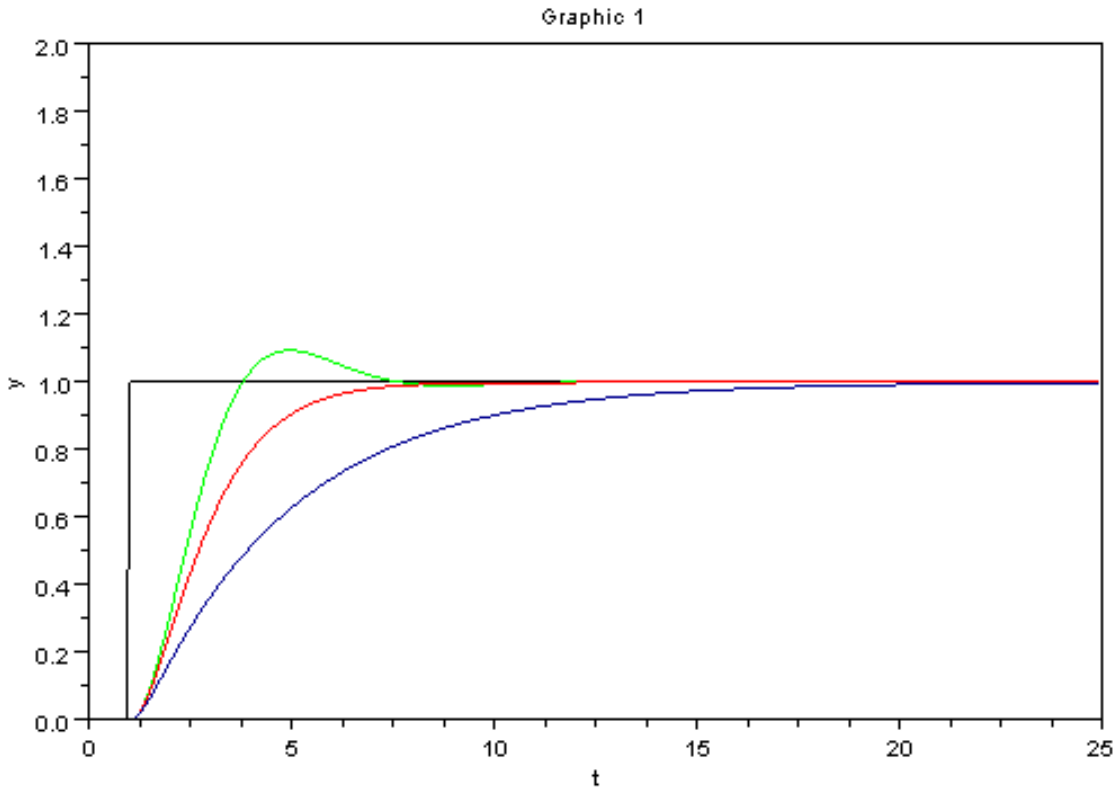
Xcos simulation response for Transfer function $\frac{1}{s^2+1}$



Xcos for plotting overlapped multiple plots

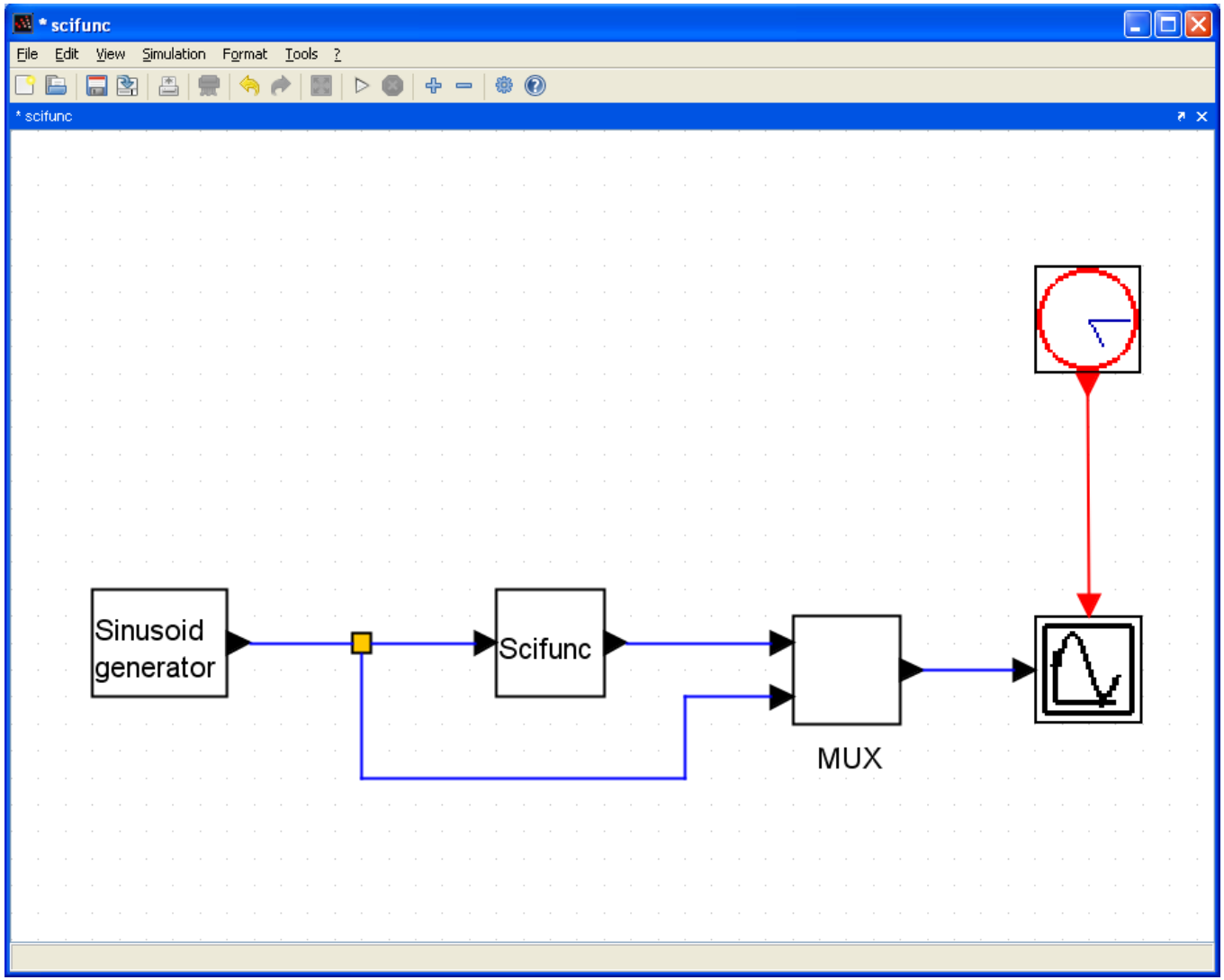


Multiple plots in Xcos



Using scifunc in Xcos

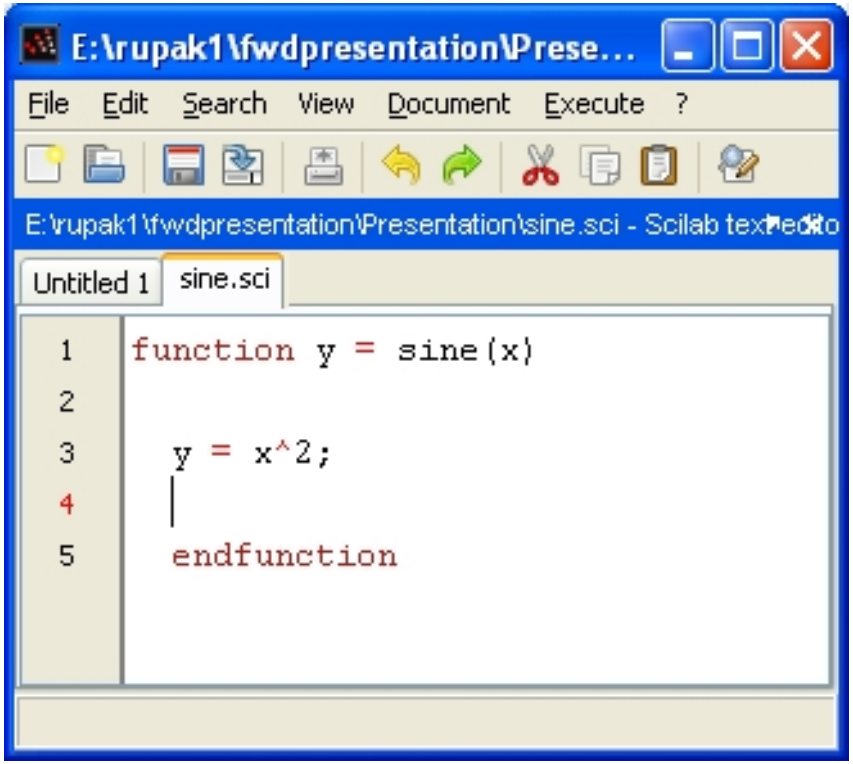
Xcos simulation diagram with scifunc block



Configuring Scifunc block

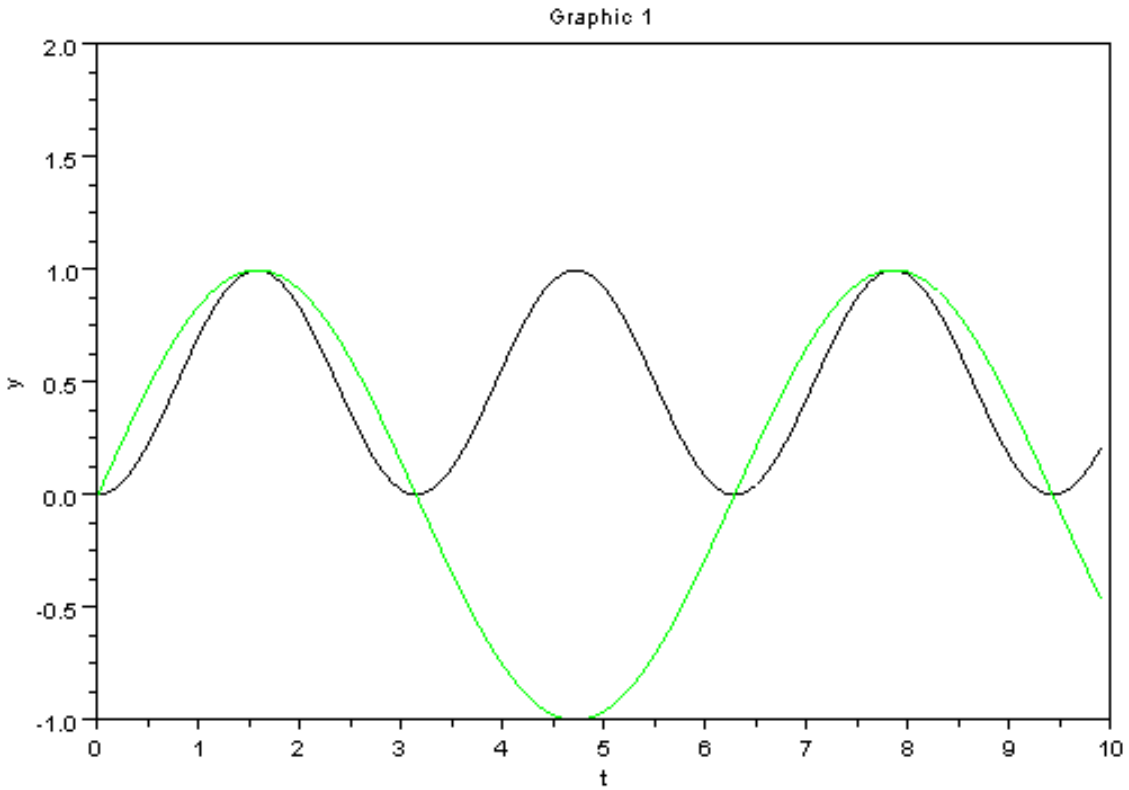
- Open the block properties of Scifunc block by double clicking on it
- Click on ok and you will be prompted to ask to enter the function name.
- Write, $y = sine(u1)$and click ok five times.
- Open editor, write the code as shown in the slide 19 and save it with some name (e.g. sine.sci).
- After making sure that you are in the same directory where the .xcos and .sci file resides, run the .sci file.
- After running the .sci file, open the xcos code and execute it.

Function code

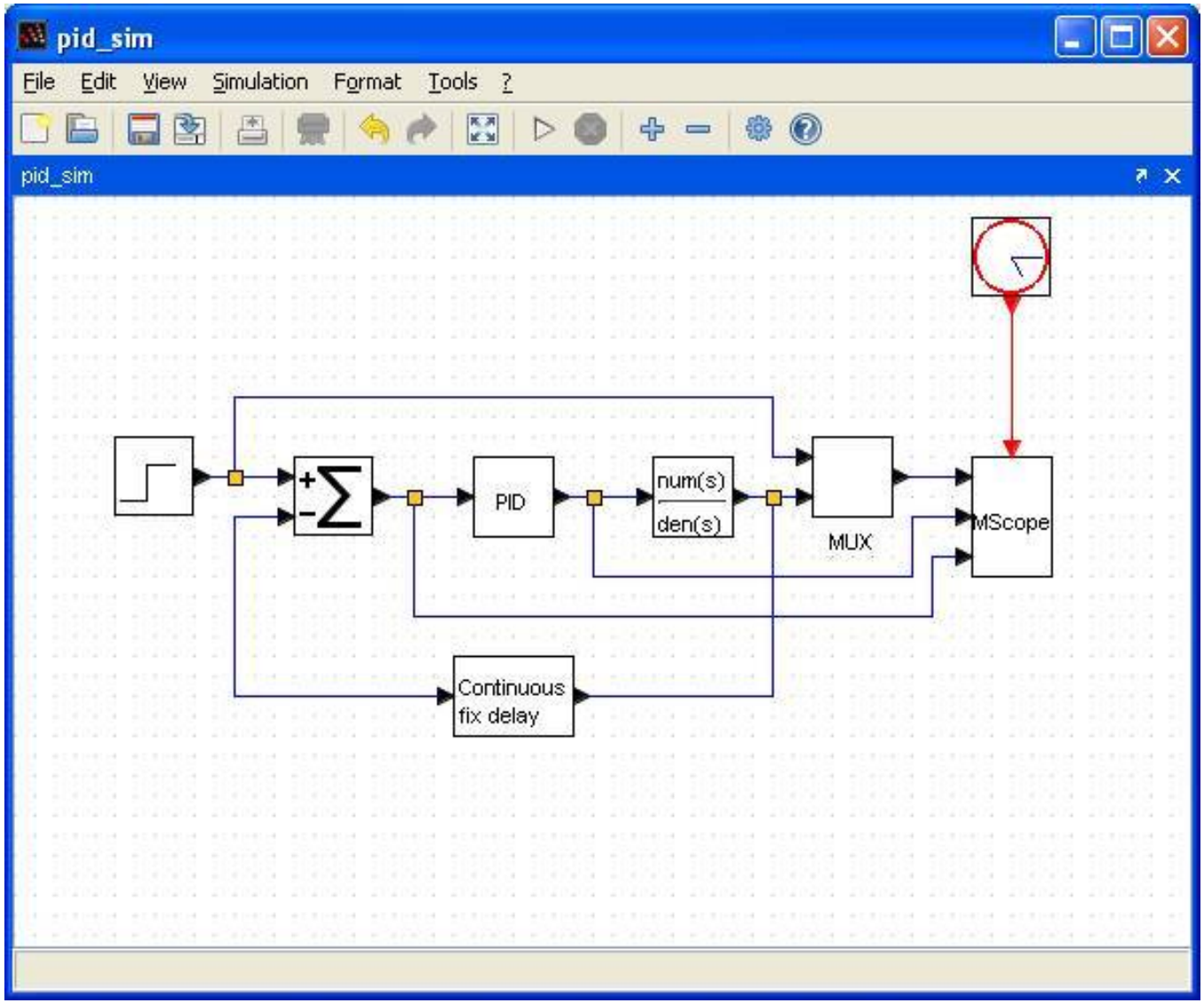


- Remember to use the same function name in the .sci as well as .xcos file.

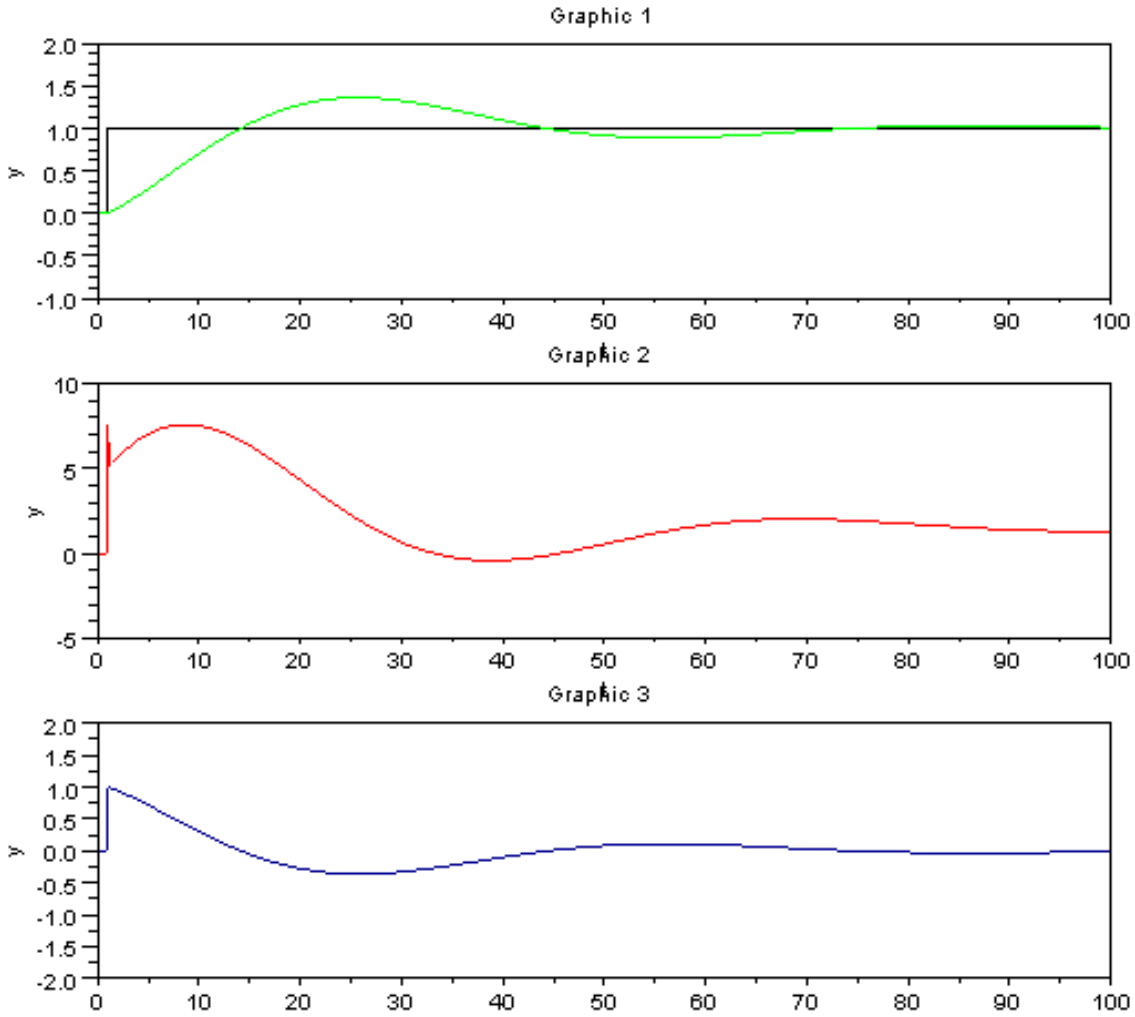
Response of Xcos simulation diagram with scifunc block



Xcos for closed loop controllers



Xcos response for closed loop controller



Thank You