

Linear Control Systems

Assignment-1(10 points)

Due date:19-08-2016, 5.00 PM

Consider the two systems, and their cascaded connection as in the Figure1. Assume any missing data

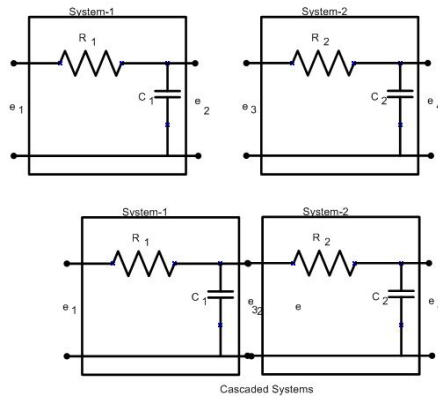


Figure 1:

- Find the transfer functions $\frac{E_2(s)}{E_1(s)}$ and $\frac{E_4(s)}{E_3(s)}$
- Find the transfer function of cascaded system $H(s) = \left(\frac{E_4(s)}{E_1(s)} \right)$ using the block diagram reduction rule of cascaded blocks
- Find $H(j\omega)|_{s=j\omega}$ in the overall transfer function
- Apply $e_1 = 5 \sin 314t$, and determine the expression for $e_4(t)$
- connect cascaded circuit in multi-sim, verify your result
- Design a isolator circuit of gain=1, using op-amp, and use this circuit as follows

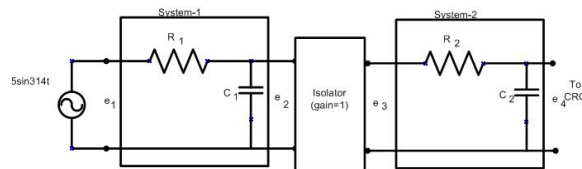


Figure 2: Non loading cascaded elements

- Now verify $e_4(t)$ obtained above, with simulation result
- Note down in which case your calculated wave form is close to simulation waveform (for theory regarding this problem refer "modern control engineering, K.Ogata", page no:77)