CEN455: Introduction Digital Control

Home-Work 1: 1st Semester 1439-1440



Problem1:

Given the electric network shown in Figure: 1. Write the differential equation for control solutions the network if v(t) = u(t), a unit step.

Solve the differential equation for the current, i(t), if there is no initial energy in the network.

3. Make a plot of your solution if $\frac{R}{L} = 1$ Assume $R = 2 \Omega$, L = 1 H, and 1/LC = 25.

Problem2:

Find the transfer function, G(s) for system shown in Figures.





<u>Problem3:</u>

For the unity feedback system,



1. Find the steady-state error for inputs of 30 u(t), 70 t u(t), and $81 t^2 u(t) if$

$$G(s) = \frac{500}{(s+24)(s^2+8s+14)}$$

2. Find the range of K for closed-loop stability if:

$$G(s) = \frac{K(s+2)}{s(s-1)(s+3)}$$