

Experiment No. 9

Title: Steady-state error minimization.

Objectives:

1. To simulate the step response and impulse response of Type-0, Type-1 & Type-2 systems with unity feedback.
2. To minimize the steady-state error.

MATLAB:

1. Write a programme in MATLAB to plot the impulse response and step response of unity gain feedback systems with open loop transfer functions $G(s)H(s) = \frac{1}{(s+2)(s+3)}$, $G(s)H(s) = \frac{1}{s(s+2)(s+3)}$ and $G(s)H(s) = \frac{(s+1)(s+4)}{s^2(s+2)(s+3)}$. Print the closed loop transfer functions on command window. (Hint: use MATLAB functions `conv`, `cloop/feedback`, `impulse` and `step`).
2. A unity gain feedback system has the forward path transfer function $G(s)H(s) = \frac{K*(s+3)(s+5)}{s(s+7)(s+8)}$. Find the value of K so that, there is 10% steady state error in open loop. Print the closed loop transfer function on command window. Write a programme in MATLAB to plot the response of given system for unit ramp input without K and with K . Compare the output responses. (Hint: use MATLAB functions `conv`, `cloop/feedback` and `lsim`).

Conclusion: (Hint: Write your interpretation from output graphs)