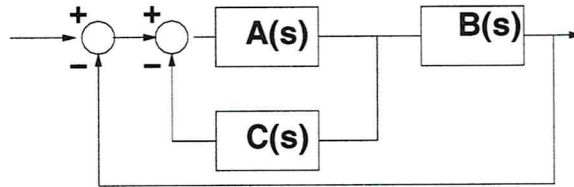


University of Massachusetts Lowell
Department of Electrical and Computer Engineering
16.413 Linear Feedback (5)

1. Given the system in the diagram



where $A(s) = M/(s + 2)$, $B(s) = 1/s$ and $C(s) = K$ find the M and K such that the damping ratio is equal to 0.7 and the undamped natural frequency is equal to 4 rad/sec.

2. Determine the conditions on K for stability

a. $s^4 + 6s^3 + 11s^2 + 6s + K = 0$

b. $s^3 + (4 + K)s^2 + 6s + 16 + 8K = 0$

3. Draw the complete root-locus of

$$GH = \frac{K}{(s^2 + 2s + 2)(s^2 + 2s + 5)}$$

4. Draw the complete root-locus of

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