

Control Systems

Gate Problem 47(ECE 2015 set-1)

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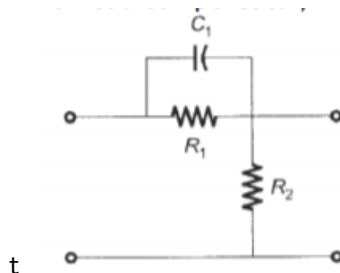
Problem Statement

A lead Compensator network includes a parallel combination of R and C in feed-forward path. If the transfer function of compensator is

$$G_c(s) = \frac{s + 2}{s + 4}$$

, the value of RC is ?

Solution



This is the circuit of lead compensator with parallel RC combination.
The transfer function for the following circuit is

$$T(s) = \frac{V_o}{V_i}$$

Let

$$\alpha = \frac{R_2}{R_1 + R_2}$$

and

$$\tau = R_1 C$$

Solution Continued..

Now our $T(s)$ is

$$T(s) = \frac{R_2}{\frac{\frac{1}{sC} R_1}{\frac{1}{sC} + R_1} + R_2}$$

Simplifying $T(s)$

$$T(s) = \frac{s + \frac{1}{\tau}}{s + \frac{1}{\tau\alpha}}$$

Comparing with the given

$$G_c(s) = \frac{s + 2}{s + 4}$$

$$\tau = R_1 C = 0.5$$