

14.55 The voltage response of a network to a unit step input is

$$V_o(s) = \frac{10}{s(s^2 + 8s + 18)}$$

Is the response critically damped?

SOLUTION:

$$V_I(s) = \frac{1}{s} \quad H(s) = \frac{V_o(s)}{V_I(s)} = \frac{10}{s^2 + 8s + 18}$$

Char. eq. is: $s^2 + 8s + 18 = s^2 + 2\zeta\omega_0 s + \omega_0^2 = 0$

$$\omega_0 = \sqrt{18} \text{ r/s}$$

$$\zeta = \frac{8}{2\sqrt{18}} = 0.94$$

Underdamped!
Not critically damped!