

**13FE-2** The Laplace transform function representing the output voltage of a network is expressed as

$$V_o(s) = \frac{120}{s(s+10)(s+20)}$$

Determine the time-domain function and the value of  $v_o(t)$  at  $t = 100$  ms.

**SOLUTION:**

$$V_o(s) = \frac{K_1}{s} + \frac{K_2}{s+10} + \frac{K_3}{s+20} \quad K_1 = \frac{120}{10(20)} = 0.6$$

$$K_2 = \frac{120}{(-10)(10)} = -1.2 \quad K_3 = \frac{120}{(-20)(-10)} = 0.6$$

$$V_o(s) = \frac{0.6}{s} - \frac{1.2}{s+10} + \frac{0.6}{s+20}$$

$$v_o(t) = [0.6 - 1.2e^{-10t} + 0.6e^{-20t}] u(t)$$

$$v_o(0.1) = 0.6 - 1.2e^{-1} + 0.6e^{-2}$$

$$v_o(0.1) = 0.24 \text{ V}$$