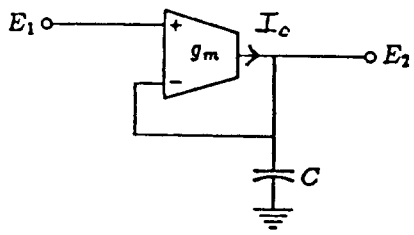
14.3



$$I_o = g_m(E_1 - E_2)$$

$$E_2 = \frac{1}{sC} I_o = \frac{1}{sC} g_m (E_1 - E_2)$$

$$sC E_2 = g_m E_1 - g_m E_2$$

$$(sC + g_m) E_2 = g_m E_1$$

$$\frac{E_2}{E_1} = \frac{g_m}{sC + g_m}$$

14.7

$$E_3 = E_4 = 0$$

$$C_1 = C_2 = 10^{-11}\ F$$

From (14.12), $\quad Q = \sqrt{\frac{g_1}{g_2}} = 2, \quad g_1 = 4g_2$

From (14.11), $\quad \omega_0 = 2\pi \times 10 = \frac{\sqrt{4g_2^2}}{C_1} = \frac{2g_2}{C_1}$

$$g_2 = 2\pi \times 10^6 \times \tfrac{1}{2} \times 10^{-11} = 31.42\ \mu\mho$$

$$g_1 = 125.7\ \mu\mho$$

14.10 $$E_2 = -\frac{g_2}{sC_2} E_3$$

$$E_3 = \frac{g_1(E_2 - E_1)}{sC_1 + g_3}$$

$$-\frac{sC_2E_1}{g_2} = \frac{g_1(E_2 - E_1)}{sC_1 + g_3}$$

solving, we get

$$\frac{E_2}{E_1} = \frac{\frac{g_1 g_2}{C_1 C_2}}{s^2 + \frac{g_3}{C_1}s + \frac{g_1 g_2}{C_1 C_2}}$$

$$\frac{E_3}{E_1} = -\frac{\frac{g_1}{C_1}s}{s^2 + \frac{g_3}{C_1} + \frac{g_1 g_2}{C_1 C_2}}$$