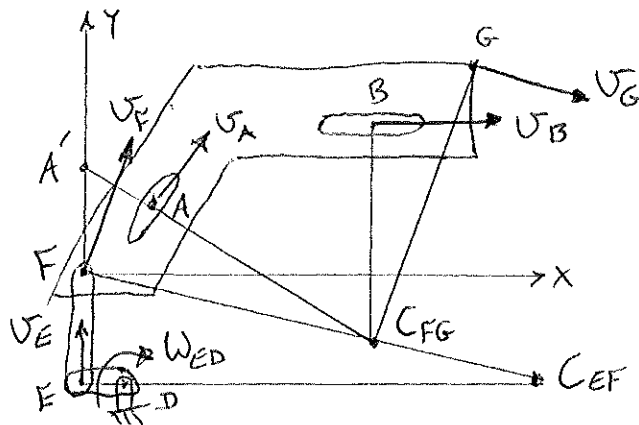


PROB. 15-92



a) FIND v_G

$$v_E = v_{ED} \omega_{ED}$$

$$v_E = (3.6 \text{ IN}) \left(6 \frac{\text{RAD}}{\text{S}} \right)$$

$$v_E = 21.6 \frac{\text{IN}}{\text{S}}$$

FIND C_{FG} :

$$x_A = 6, \quad y_A = 6, \quad x_{A'} = 0, \quad y_{A'} = 6 + 6 \tan 30^\circ = 9.464 \text{ IN}$$

$$y = mx + b$$

$$m = \frac{y_A - y_{A'}}{x_A - x_{A'}} = \frac{(6) - (9.464)}{(6) - (0)} = -0.5773$$

$$y = -0.5773x + 9.464$$

$$\text{AT } x_B = 24 \text{ IN}, \quad y = -0.5773(24) + 9.464 = -4.391$$

$$C_{FG}(24, -4.391) \text{ IN}$$

FIND C_{EF} :

$$y = mx + b$$

$$F(0, 0), \quad C_{FG}(24, -4.391)$$

$$m = \frac{y_F - y_C}{x_F - x_C} = \frac{(0) - (-4.391)}{(0) - (24)} = -0.1830$$

$$y = -0.183x$$

$$\text{AT } y_E = -8 \text{ IN}, \quad x_{CEF} = \frac{(-8)}{(-0.183)} = 43.72 \text{ IN}$$

$$C_{EF}(43.72, -8) \text{ IN}$$

PROB. 15-92 CONT.

$$V_E = r_{CEF} \omega_{EF} \Rightarrow \omega_{EF} = \frac{V_E}{r_{CEF}} = \frac{(21.6 \frac{IN}{S})}{(43.72 IN)} = 0.4940 \frac{RAD}{S}$$

$$V_F = r_{CEF} \omega_{EF}$$

$$\textcircled{1} r_{CEF} = \sqrt{8^2 + 43.72^2} = 44.44 IN$$

$$V_F = (44.44 IN) \left(0.4940 \frac{RAD}{S} \right) = 21.96 \frac{IN}{S} \quad \nearrow 79.63^\circ$$

$$\phi = \tan^{-1} \left(\frac{4.391}{24} \right) = 10.37^\circ, \quad \theta = 90 - 10.37 = 79.63^\circ$$

$$V_F = r_{CFG} \cdot \omega_{FG} \Rightarrow \omega_{FG} = \frac{V_F}{r_{CFG}}$$

$$r_{CFG} = \sqrt{4.391^2 + 24^2} = 24.40 IN$$

$$\omega_{FG} = \frac{(21.96 \frac{IN}{S})}{(24.4 IN)} = 0.900 \frac{RAD}{S}$$

$$V_G = r_{CFG} \cdot \omega_{FG}$$

$$G(32, 17) IN$$

$$r_{CFG} = \sqrt{(17 + 4.391)^2 + (32 - 24)^2} = 22.84 IN$$

$$V_G = (22.84 IN) \left(0.9 \frac{RAD}{S} \right) = 20.55 \frac{IN}{S} \quad \searrow 20.50^\circ$$

$$\phi = \tan^{-1} \left[\frac{(32 - 24)}{(17 + 4.391)} \right] = 20.50^\circ$$