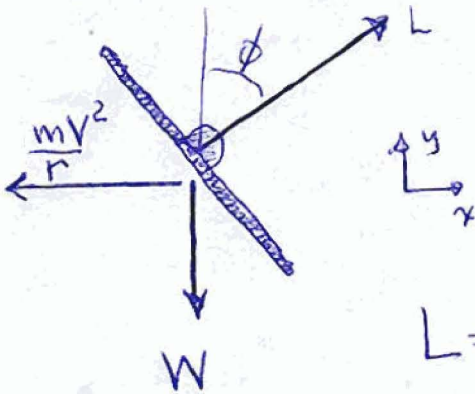


PA SOLUTIONS BY WAITZSTEADY LEVEL TURN

$$\sum F_y: L \cos \phi = W$$

$$\sum F_x: L \sin \phi = \frac{W}{g} \frac{v^2}{r}$$

$$L = \frac{1}{2} \rho V^2 S C_L \quad D = \frac{1}{2} \rho V^2 S C_D$$

$$C_D = C_{DA_0}/S + c_d + \frac{C_L^2}{\pi A R}$$

$$\therefore V = \left[\frac{2W}{\rho S \cos \phi C_L} \right]^{1/2}$$

$$P_{reg} = DV = \frac{1}{2} \rho V^3 S C_D = \left[\frac{2W^3}{\rho S (\cos \phi)^3} \right]^{1/2} \frac{C_D}{C_L^{3/2}}$$

$$P_{elec} = \frac{P_{reg}}{\eta_m \eta_p} = \frac{1}{\eta_0} \left[\frac{2(W/\cos \phi)^3}{\rho S} \right]^{1/2} \left[\frac{C_{DA_0}/S + c_d}{C_L^{3/2}} + \frac{C_L^{1/2}}{\pi A R} \right]$$

$$t_{max} = \frac{E_{elec}}{P_{elec_{min}}}$$

$$r = \frac{V^2}{g \tan \phi}$$

