

3.9 #5 p. 214 Andy Raich

5) Forced vibrations without damping

$$m u'' + k u = F_0 \cos \omega t$$

$$k = \frac{mg}{L} = \frac{4 \text{ lbs}}{1.5 \text{ in}} = \frac{8}{3} \text{ lb/in} \cdot \frac{12 \text{ in}}{1 \text{ ft.}} = 32 \text{ lb/ft.}$$

$$W = 4 \text{ lbs} \quad u(0) = 2 \text{ in.} = \frac{1}{6} \text{ ft.}$$

$$u'(0) = 0 \text{ ft./sec.}$$

$$m = \frac{W}{g} = \frac{4 \text{ lbs}}{32 \text{ ft./sec}^2} = \frac{1}{8} \frac{\text{lb sec}^2}{\text{ft.}}$$

$$\frac{1}{8} u'' + 32 u = 2 \cos 3t \quad u(0) = \frac{1}{6}$$

$$u'(0) = 0$$

$$u'' + 256 u = 16 \cos 3t, \quad u(0) = \frac{1}{6}$$

$$u'(0) = 0$$