Problem 2

Tracking data for an Earth orbiting satellite indicates the altitude = 600 km, $r\dot{f} = 7 \text{ km/s}$, and $\dot{r} = 3.5$ km/s. Determine the eccentricity e and the true anomaly f at the data point. (Earth radius = 6378 km).

$$r_{i}^{2} = 7 | 2ms^{-1}$$
 $(V| = (i^{-2} + r_{i}^{2})^{1/2} = 7.826 | b.$

$$\dot{r} = 3.5 \, \text{kms}^2$$
 = $(3.5^2 + 7^2)^{\frac{1}{2}} = 7.826 \, \text{k}$

$$V = \left(\frac{z}{r} - \frac{1}{p}\right)^{1/2} = \left(\frac{z}{6978} - \frac{7.826^{2}}{328600}\right)^{1/2} = \frac{7521 \text{ km}}{100000}$$

$$\frac{1}{a^{2}} = r \times r = 6978 \times 7 = 48846$$

$$\frac{1}{a^{2}} = \frac{1}{a(1-e^{2})} = \frac{1}{a^{2}} = a(1-e^{2})$$

$$\frac{1}{1+e \cos(8)} = \frac{a(1-e^2)}{(1+e \cos(8))} \qquad \frac{1}{p^2} = a(1-e^2)$$

$$r = \frac{h^2}{p} \frac{1}{1 + e \cdot \omega(g)} = \frac{a(1 - e^2)}{(1 + e \cdot \omega(g))} \frac{h^2}{p} = a(1)$$

$$\frac{1}{1+e^{i\alpha}(8)} = \frac{a(1-e^2)}{(1+e^{i\alpha}(8))} \qquad \frac{h^2}{p} = a(1)$$

$$\frac{1}{18} = \frac{1}{16} \left(\frac{1}{16} - \frac{1}{16} \right)$$

$$\frac{1}{16} = \frac{1}{16} \cdot \frac{1}{16} = \frac{1}{16} = \frac{1}{16} \cdot \frac{1}{16} = \frac{1}{16} \cdot \frac{1}{16} = \frac{1}{16} = \frac{1}{16} \cdot \frac{1}{16} = \frac{1}{$$

$$\frac{48846^{2}}{378600 \times 7521} \Big|_{12}^{1/2} = 0.452$$

$$e = \left(1 - \frac{48846^2}{378600 \times 7521}\right)^{1/2} = 0.452$$

$$\frac{1}{1000} = 0.452$$

$$\frac{46846}{378600 \times 7521}$$

$$\frac{1}{1} = a(1-e^2) \cdot \frac{1}{1+200}$$

$$\frac{h^2}{p} = a(1-e^2) \cdot \frac{1}{1+e^{-2}}$$

6978 x 3.5 7521 x 398600 (- 6978)

• Far
$$\int ...$$

ten $(\xi/z) = \int \frac{1+e}{z} t_{z} \left(\frac{E}{z}\right)$

Sin (Eo) = rr e a N

 $\tan (E_0) = \frac{r \cdot c}{\sqrt{a \nu}} \cdot \left(\frac{1}{1 - \frac{r_0}{a}} \right)$

$$\cos f$$

$$\cos f = \left(\frac{1}{r} - 1\right)$$

$$E_0 = 80.806$$

$$\frac{\sqrt{376600} \times 7521}{\sqrt{1+e^2}} = a(1-e^2) \cdot \frac{1}{1+e^2}$$

$$\cos f = \left(\frac{a(1-e^2)}{r} - 1\right)\frac{1}{e}$$

$$\xi = 2 a \tan \left(\frac{1 + 0.4518}{1 - 0.4518} \cdot \tan \left(\frac{1.498}{2} \right) \right)$$

$$= \left(\frac{a(1-e^2)}{r} - 1\right)\frac{1}{e}$$

$$E_0 = 80.806$$

$$f(a(1-e^2))$$

$$e = \left(1 - \frac{\mu^2}{\mu a}\right)^{k_z}$$