

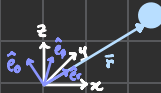
Homework-3

Problem 8

Due : 28 - Jan-2025

Time Spent : 1.5 Hours

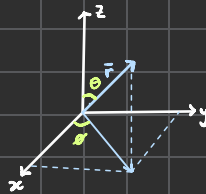
Sketch:



Given:  $\ddot{a} = 0$ ,  $\theta, \psi = \text{constant}$ ,  $\bar{r}_0, \bar{v}_0$

To Find: Equations of Motion

Define:  $\theta$  and  $\psi$  as



$$\bar{r} = r \hat{a} = r \sin \theta \cos \phi \hat{i} + r \sin \theta \sin \phi \hat{j} + r \cos \theta \hat{k}$$

Define:  $z = \begin{bmatrix} r \\ \theta \\ \phi \\ \psi \end{bmatrix}$

$$\dot{z} = \begin{bmatrix} \dot{z}(t) \\ 0 \\ 0 \\ 0 \end{bmatrix}$$