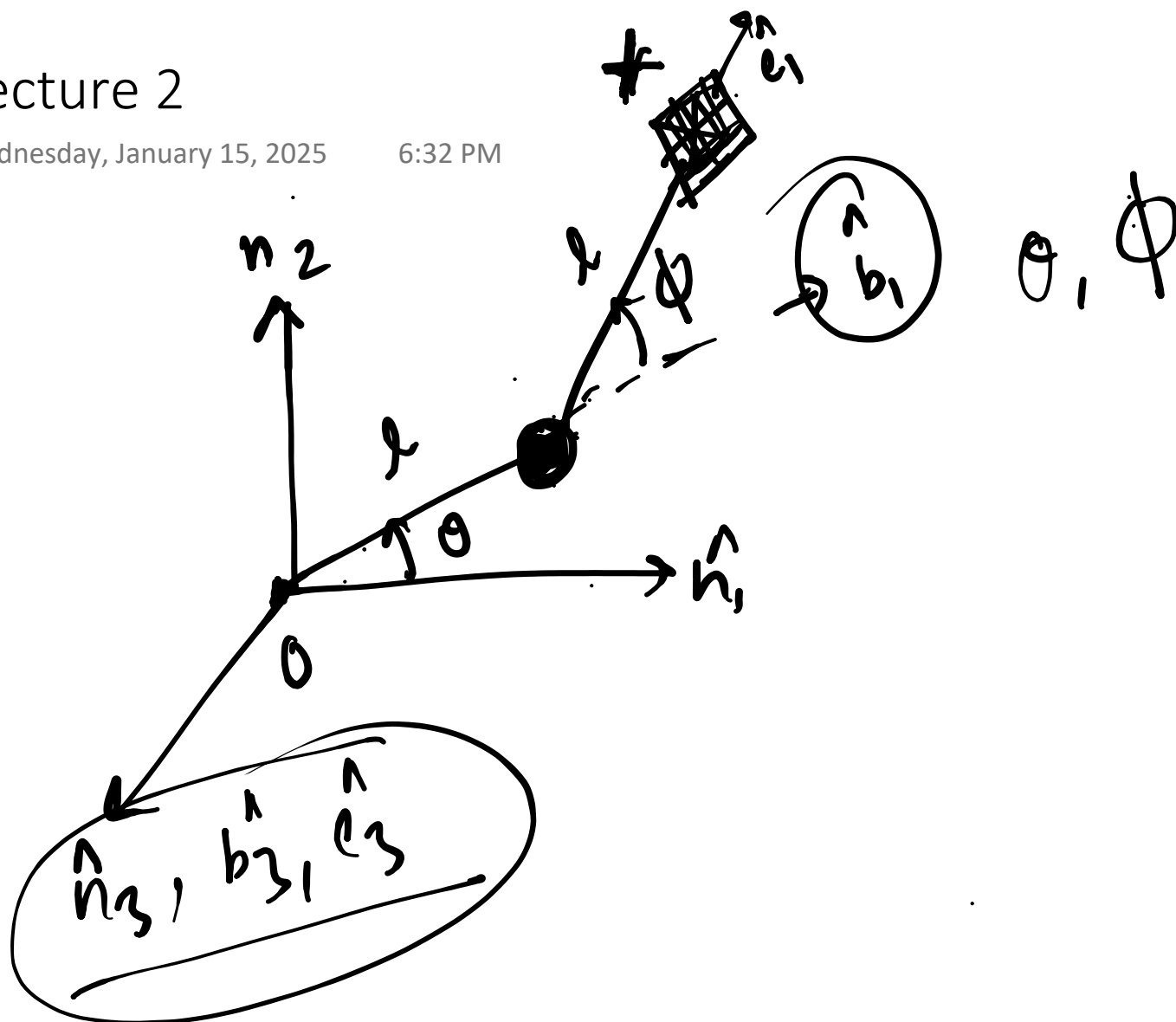


Lecture 2

Wednesday, January 15, 2025

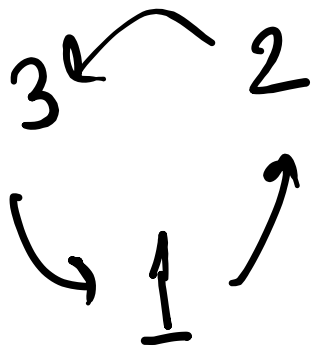
6:32 PM



$$N: \{ \hat{n}_1, \hat{n}_2, \hat{n}_3 \}$$

$$E: \{ \hat{e}_1, \hat{e}_2, \hat{e}_3 \}$$

$$B: \{ \hat{b}_1, \hat{b}_2, \hat{b}_3 \}$$



DOF: 2

$$\underline{P} = \boxed{l \hat{b}_1 + l \hat{e}_1}$$

$$\begin{cases} \underline{\omega}_{B/N} = \dot{\theta} \hat{b}_3 \\ \underline{\omega}_{E/N} = \dot{\theta} \hat{e}_3 + \dot{\phi} \hat{e}_3 \end{cases}$$

$$\frac{N}{dt} \frac{d(\underline{P})}{dt} = \frac{B}{dt} \frac{d(l \hat{b}_1)}{dt} + \underline{\omega}_{B/N} \times (l \hat{b}_1)$$

$$+ \frac{E}{dt} \frac{d(l \hat{e}_1)}{dt} + \underline{\omega}_{E/N} \times (l \hat{e}_1)$$

$$= \dot{\theta} \hat{b}_3 \times (l \hat{b}_1) + (\dot{\theta} \hat{e}_3 + \dot{\phi} \hat{e}_3) \times (l \hat{e}_1)$$

$$= \left(\dot{\theta} l \hat{b}_2 \right) + \underline{\dot{\theta} l \hat{e}_2 + \dot{\phi} l \hat{e}_2}$$

B E