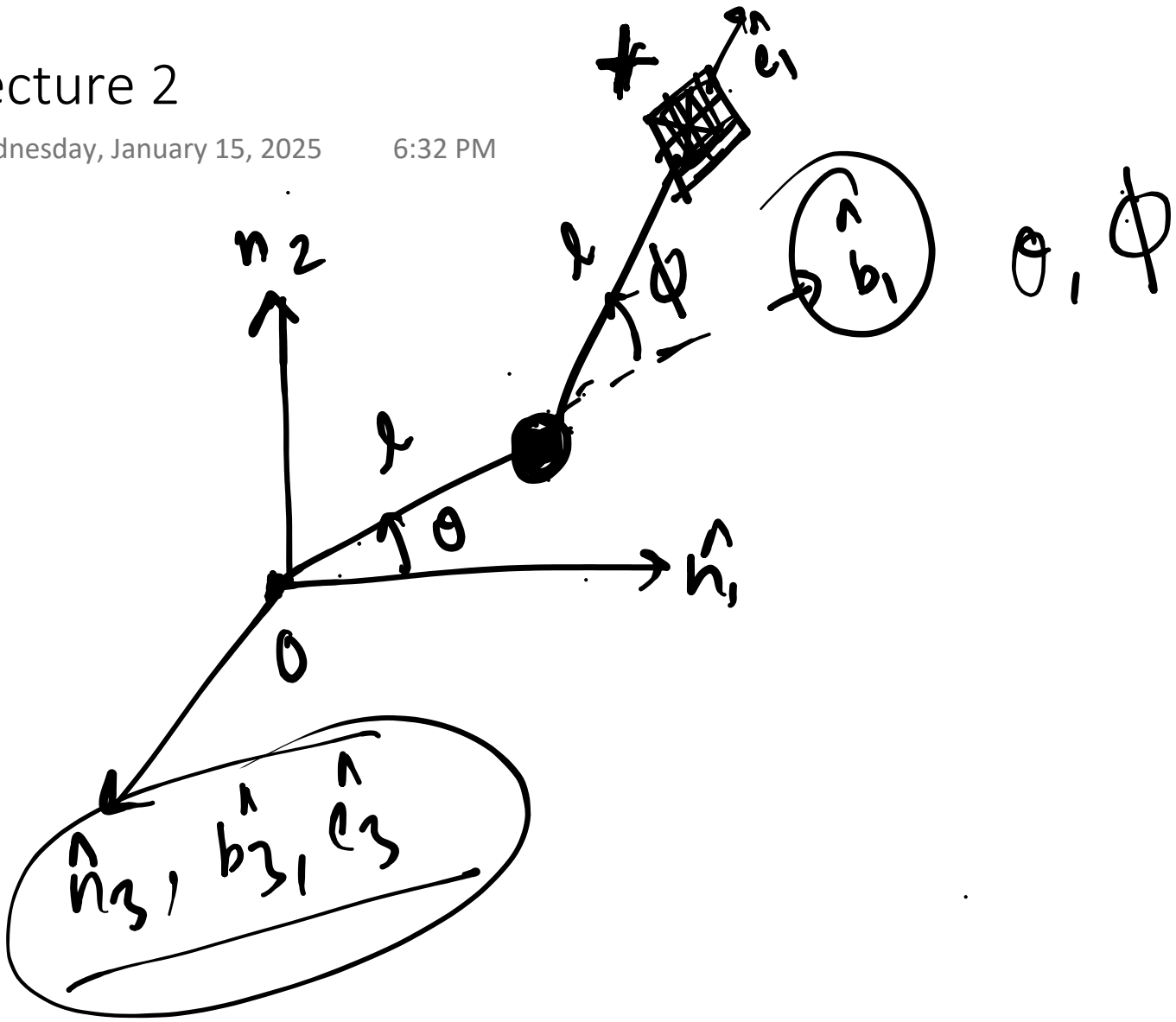
Lecture 2

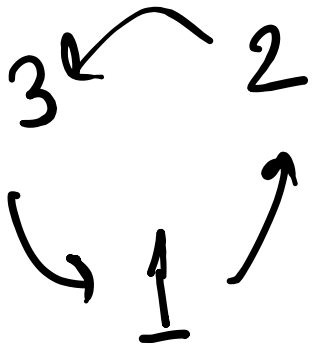
Wednesday, January 15, 2025 6:32 PM



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

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

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



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DOF: 2

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

$$\omega_{B/N} = \dot{\theta} \hat{b}_3$$

$$\omega_{E/N} = \dot{\theta} \hat{e}_3 + \dot{\phi} \hat{e}_3$$

$$\frac{{}^N d(\underline{P})}{dt} = \cancel{\frac{{}^B d}{dt}(\ell \hat{b}_1)}^{0} + \underline{\omega}_{B/N} \times (\ell \hat{b}_1)$$

$$+ \cancel{\frac{{}^E d}{dt}(\ell)}^{0} + \underline{\omega}_{E/N} \times (\ell \hat{e}_1)$$

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

$$= (\dot{\theta} \ell \hat{b}_2) + \dot{\theta} \ell \hat{e}_2 + \dot{\phi} \ell \hat{e}_2$$

B E