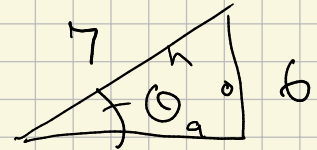


Thursday: Project 3

• Notes on quiz

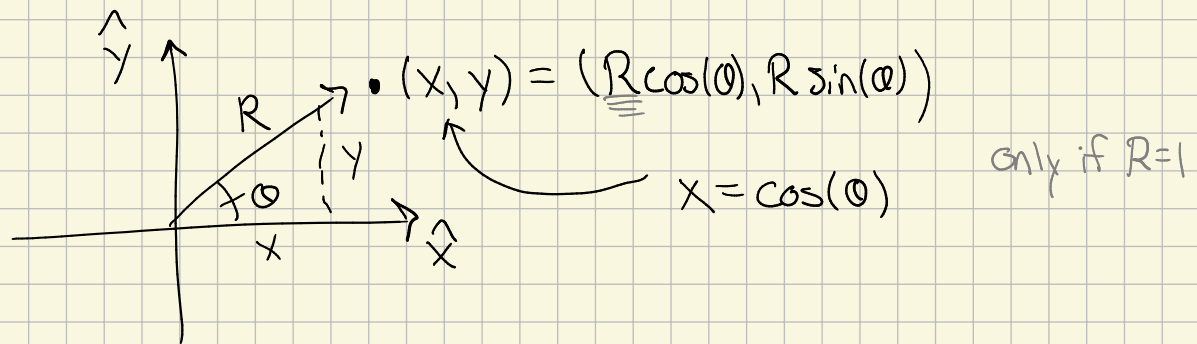
- Processes vs solutions
- Exact ratios when possible

$$\sin(\theta) = ? = \frac{6}{7}$$



$$\sin(\theta) \approx 0.86$$

• Polar coords:

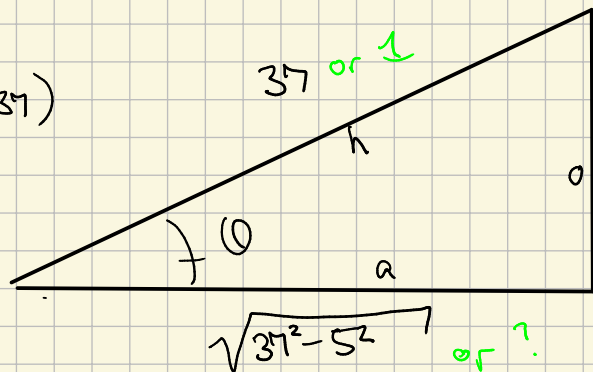


• Why do any of this? Calculus!

Solving an "integral" \leadsto $\cos(\arcsin(5/37)) = ?$

$$\hookrightarrow \cos(\theta) = ?$$

$$\theta = \arcsin(5/37)$$



$$= \frac{\sqrt{37^2 - 5^2}}{37}$$

$$5^2 + a^2 = 37^2$$

$$\Rightarrow \sin(\theta) = \sin(\arcsin(5/37))$$

$$\Rightarrow \sin(\theta) = 5/37 \quad \leftarrow \text{on a restricted domain}$$
$$= o/h$$

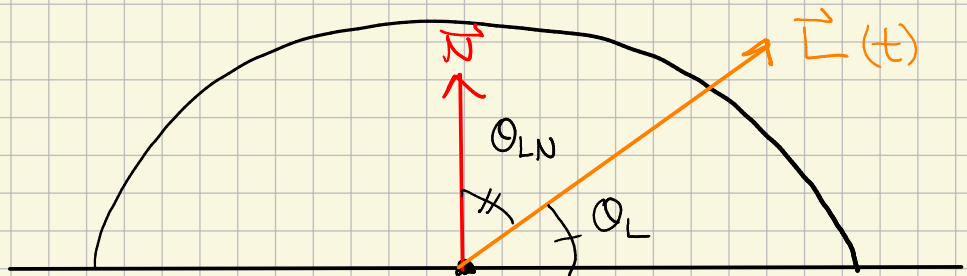
- Last note: watch the video! (graded)

Project Details

Reminder
(Office hours)

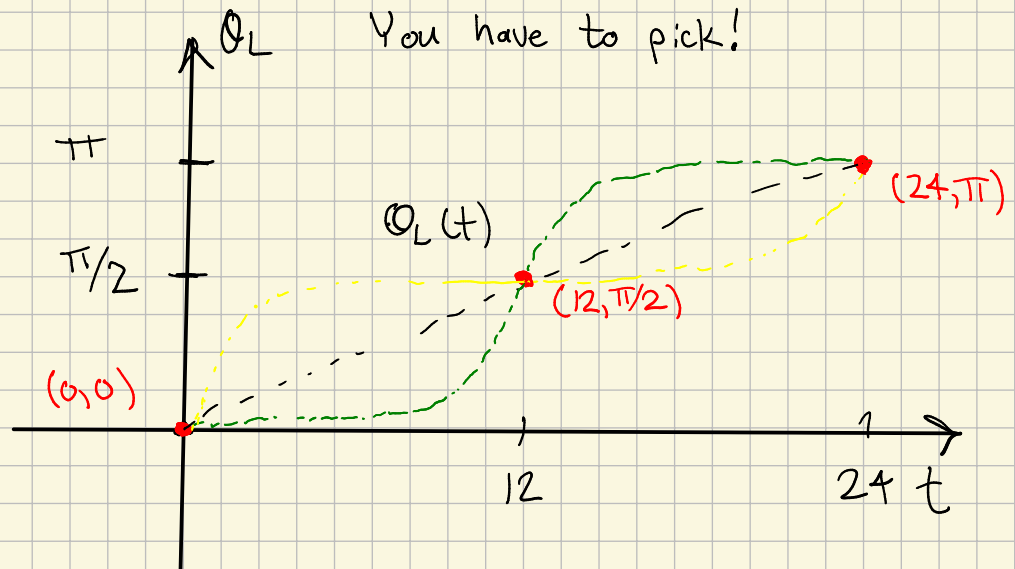
⚠ Refer to class notes, video, handout closely!

Model:

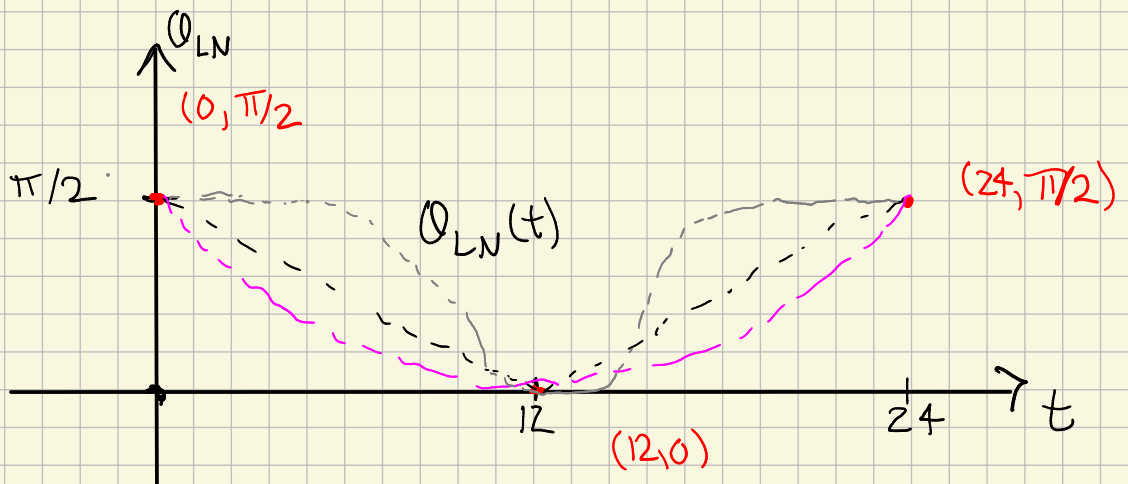


Want (for rough draft)

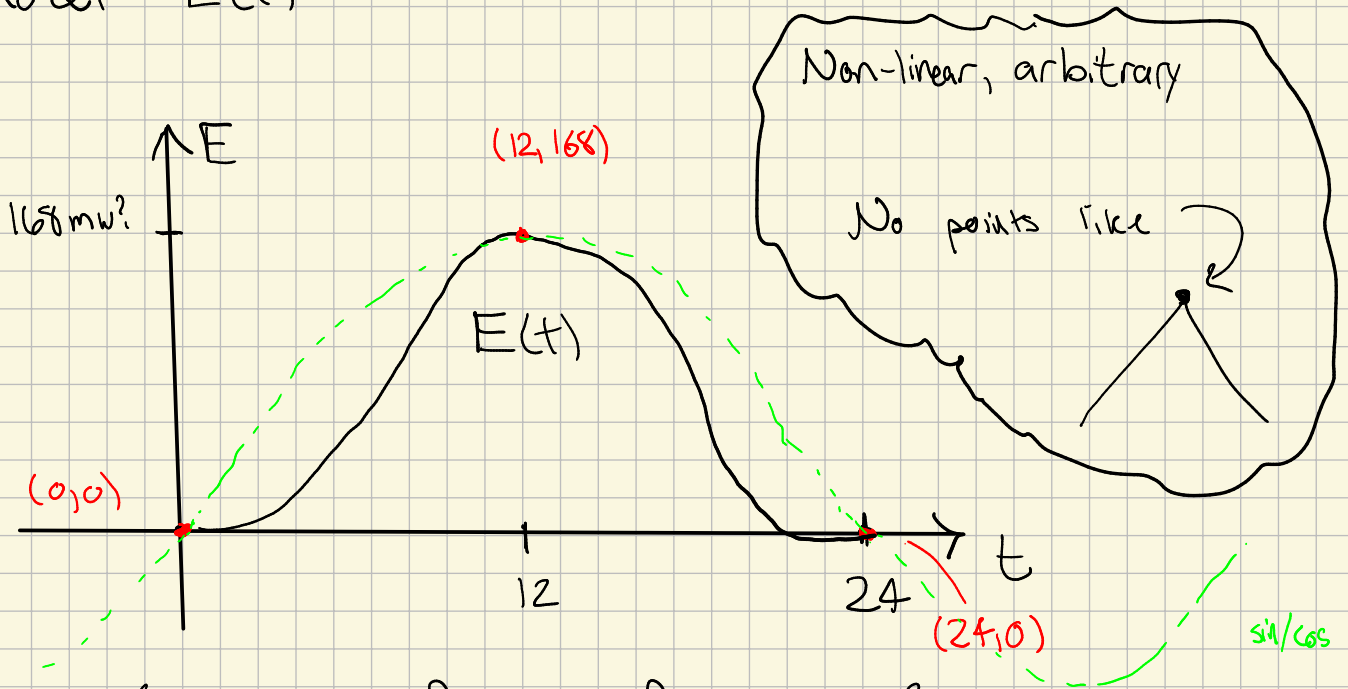
① • $\theta_L(t)$



• $\theta_{LN}(t)$



② Model $E(t)$



Q: is this a function of Θ_L or Θ_{LW} ?

$$E(t) = \underline{f}(\Theta_{LW}(t))?$$

Need to include (for $\Theta_L(t)$, $\Theta_{LW}(t)$, $E(t)$)

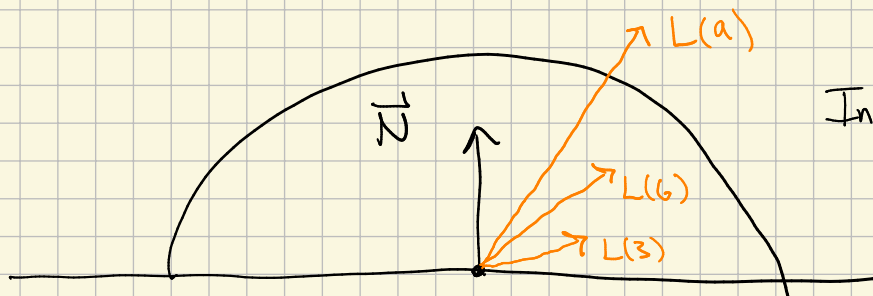
- Formulas
- Graphs (labels important!)
- • Domains and ranges (eg $\text{domain}(\Theta_L(t)) = [0, 24]$)
- Explain the periodicity (how to extend domain to \mathbb{R})

③ Deriving the vector components

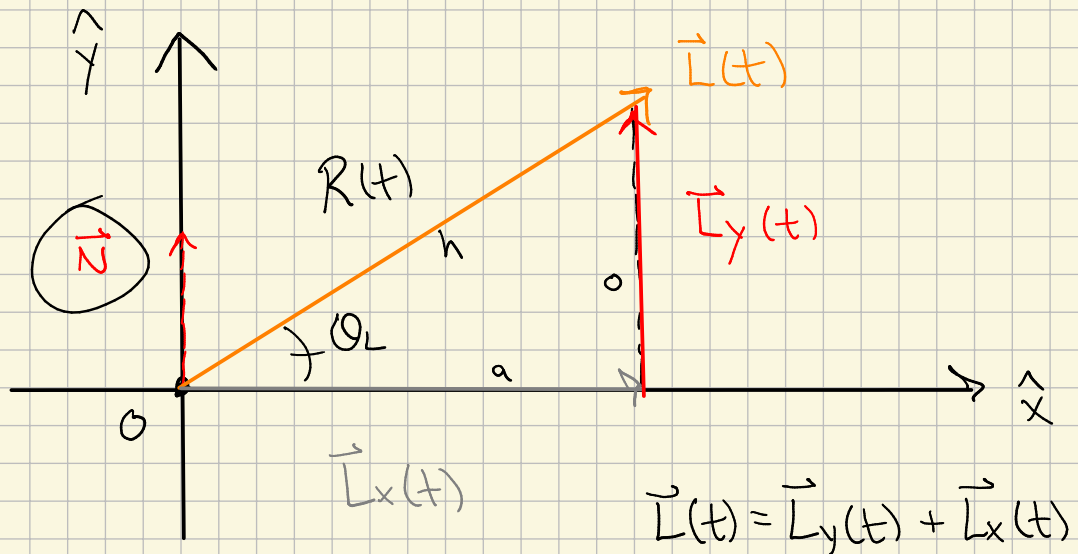
New: don't assume

$$\|\vec{L}\| = 1$$

Instead $\|\vec{L}(t)\| = E(t)$



Choose a coord system along \vec{N}



$$R(t) = \|\vec{L}(t)\| = E(t)$$

$$o = \|\vec{L}_y\|$$

Q: What is $\|\vec{L}_y(t)\|$?

$$h = \|\vec{L}\|$$

$$\sin(\theta_L(t)) = \frac{o}{h}$$

$$a = \|\vec{L}_x\|$$

$$= \frac{\|\vec{L}_y(t)\|}{R(t)} = \frac{\|\vec{L}_y(t)\|}{E(t)}$$

$$\Rightarrow \|\vec{L}_y(t)\| = E(t) \sin(\theta_L(t))$$

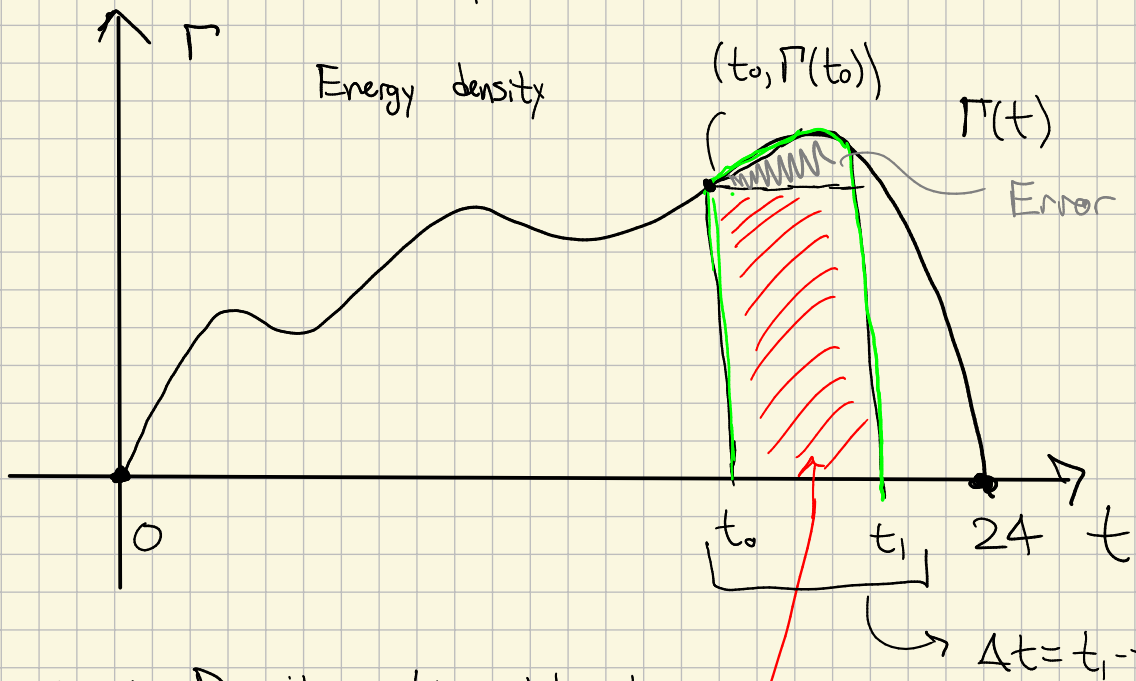
④ Total Energy Density

$$\Gamma(t) = \|\vec{L}_y(t)\| \cdot A$$

Area

$$= E(t) \sin(\theta_L(t)) \cdot A$$

Graph on $[0, 24]$



Total energy = Density · time interval
in one
 $[t_0, t_1] \approx$ Area under the graph

$$= \Gamma(t_0) \Delta t$$

Total energy: break up $[0, 24]$ into $\underline{[0, t_1]} \cup \underline{[t_1, t_2]} \cup \dots \cup \underline{[t_n, 24]}$

$\Gamma(t_0) \Delta t + \Gamma(t_1) \Delta t + \dots$

OH; 11-12
3-4