Tuesday

Review

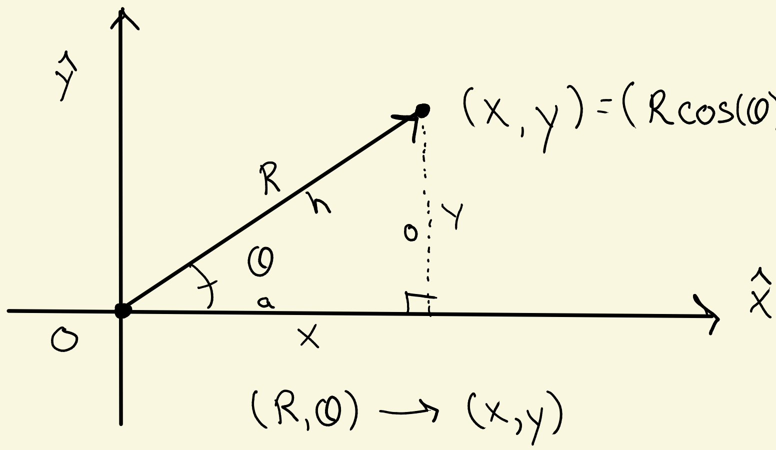
- Special (reference) angles (5 angles)
- Mnemonic

  sin ~ y - coords
  cos ~ x - coords

⚠ Always draw a picture

- Polar Coordinates / Vectors

Pick (R, θ)



$(x, y) = (R\cos(\theta), R\sin(\theta))$

$(R, \theta) \longrightarrow (x, y)$

$R^2 = x^2 + y^2$

$\tan(\theta) = \frac{o}{a} = \frac{y}{x}$

$\Rightarrow \arctan(\tan(\theta)) = \arctan(y/x)$

$\Rightarrow \theta = \arctan(y/x)$

(Won't need much)

Going backwards: Given (x, y), then

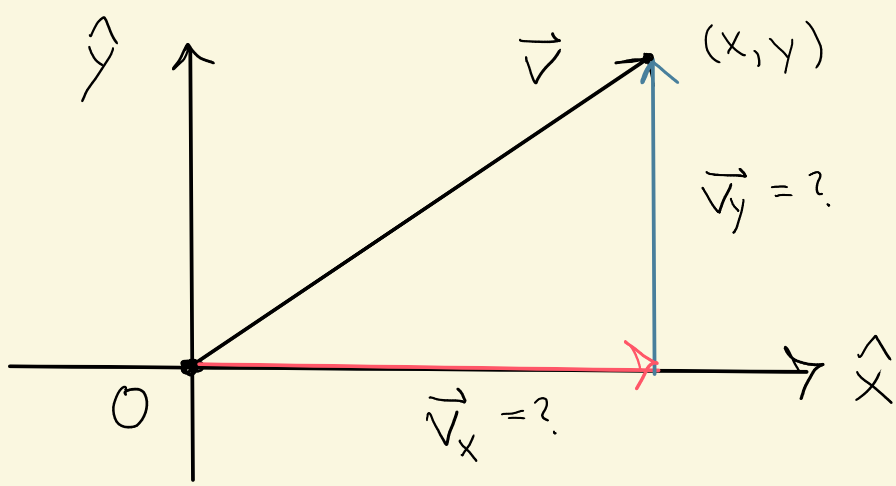
- $R = \sqrt{x^2 + y^2}$

  θ = a little complicated!

- $\theta_{Ref} = \arctan(y/x)$

  $\hookrightarrow \theta = \theta_{Ref} \pm \pi$

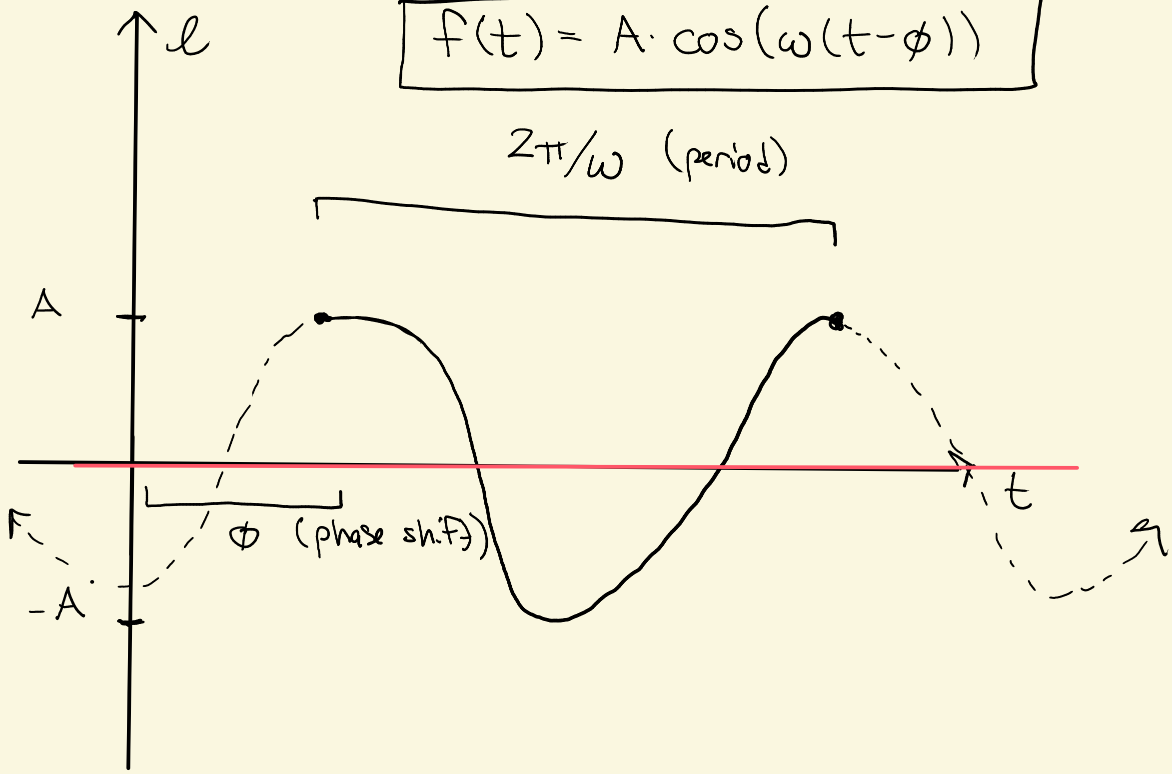
- Vectors, breaking into components



(Use polar coords)

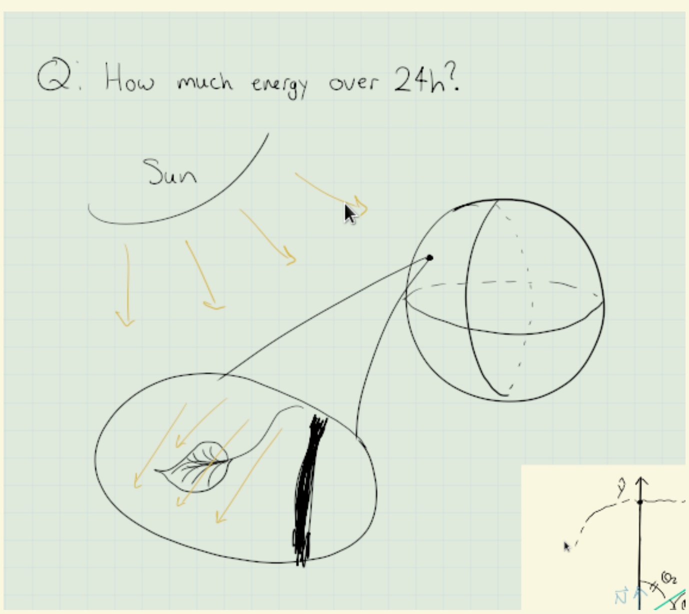
- General form of a wave

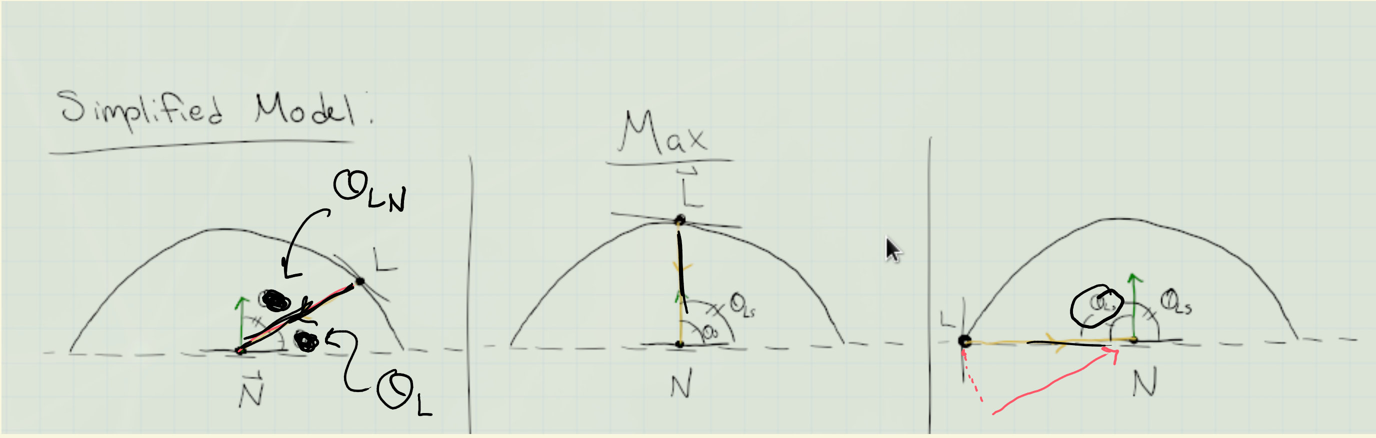
$$\boxed{f(t) = A \cdot \cos(\omega(t-\phi))}$$



Project

- See video!





Think of L as a function of time, L(t)

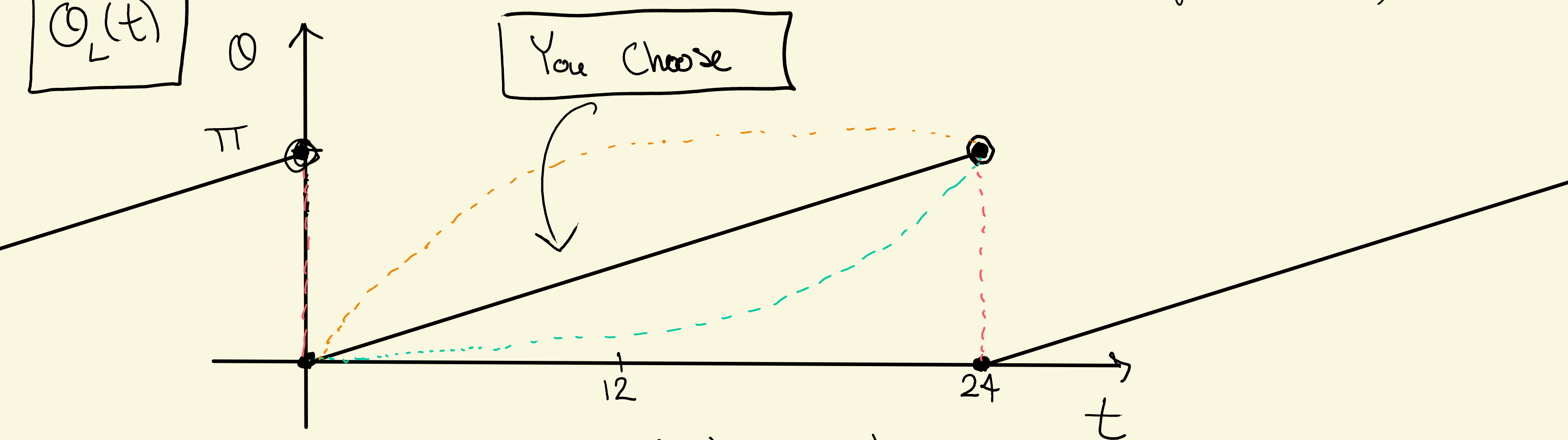
↳ Simplify to $\theta_L(t)$, $\theta_{LN}(t)$

$\theta_L(t)$

$\text{dom}(\theta_L(t)) = [0, 24)$

$\text{range}(\theta_L(t)) = [0, \pi)$

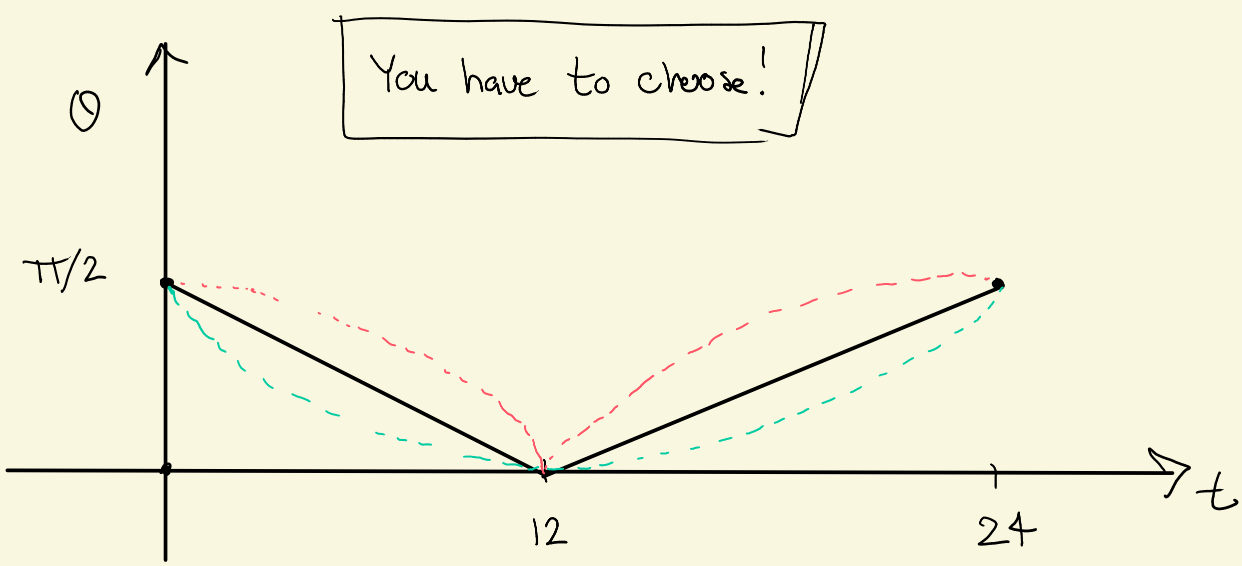
$\boxed{\theta_L(t)}$



$\theta_L(0) = \theta_L(24) = 0$

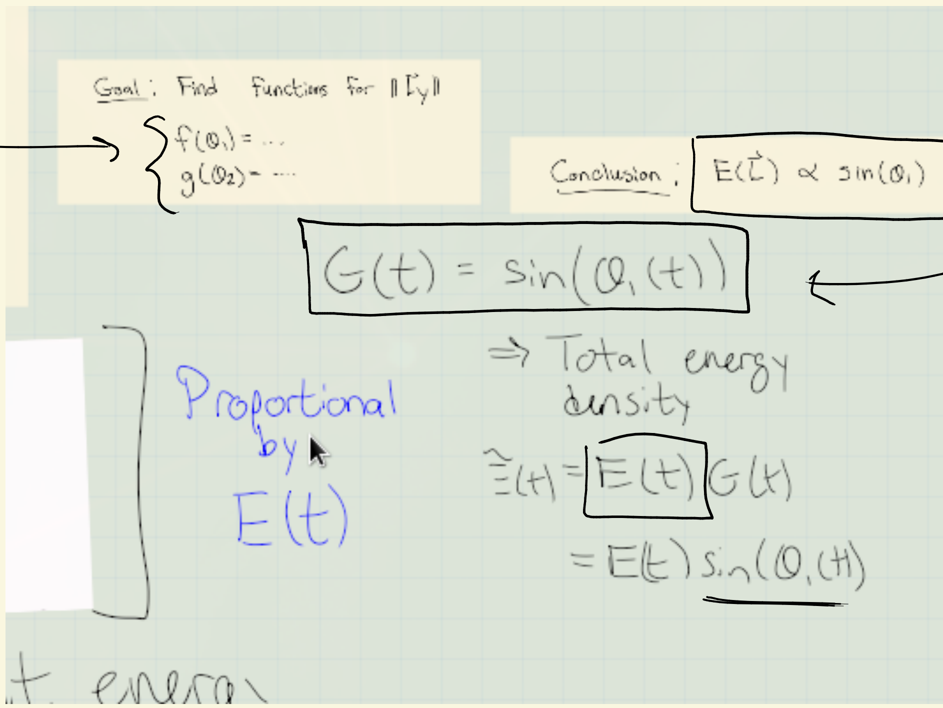
$\theta_L(t) = a_2 t^2 + a_1 t + a_0$? $\theta_L(t) = a_1 t + a_0$

$\boxed{\theta_{LN}(t)}$



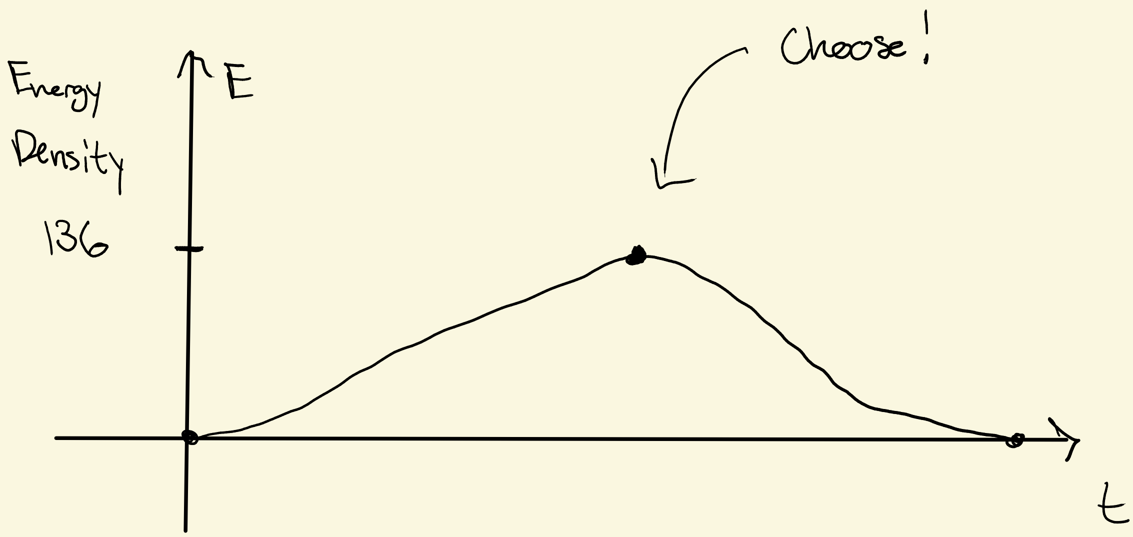
$\theta_L(t)$

$\theta_{LN}(t)$



Assuming $\|L\| = 1$

Find energy density function



Total Energy in a time period $\Delta t = E(t) \cdot G(t) \cdot A \cdot \Delta t$