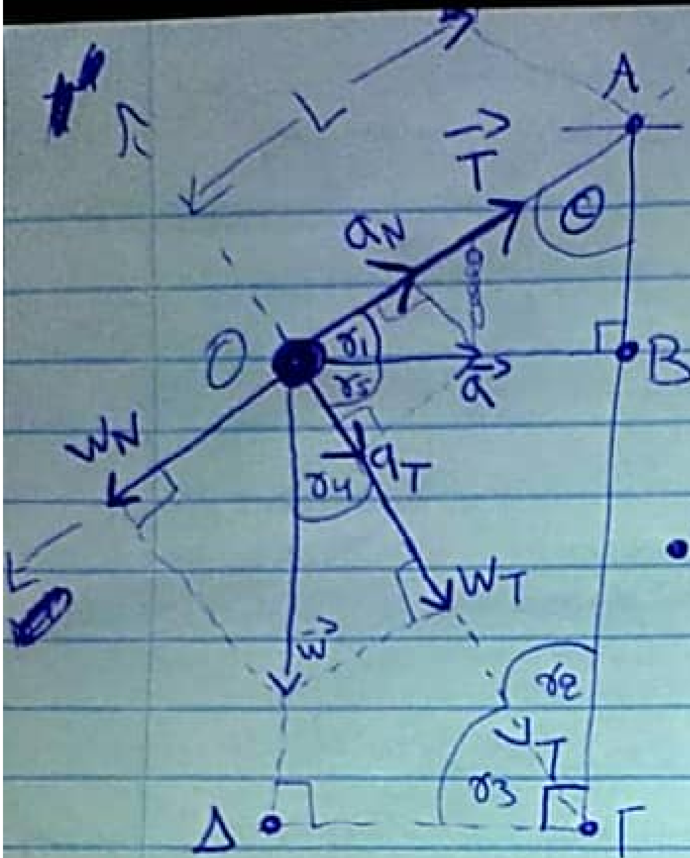

Calculating Angles

$O\hat{B}A$: $\gamma_1 + 90^\circ + \vartheta = 180^\circ$

$\Rightarrow \boxed{\gamma_1 = 90^\circ - \vartheta}$

• $\gamma_1 + \gamma_5 = 90^\circ \Rightarrow \gamma_5 = 90^\circ - \gamma_1 = \cancel{90^\circ} - \cancel{90^\circ} + \vartheta$

$\Rightarrow \boxed{\cancel{\gamma_5 = \vartheta}} \Rightarrow \boxed{\gamma_5 = \vartheta}$

$\Gamma\hat{O}A$: $\gamma_2 + 90^\circ + \vartheta = 180^\circ$

$\Rightarrow \boxed{\gamma_2 = 90^\circ - \vartheta}$

$\gamma_2 + \gamma_3 = 90^\circ \Rightarrow \gamma_3 = 90^\circ - \gamma_2 = 90^\circ - 90^\circ + \vartheta \Rightarrow \boxed{\gamma_3 = \vartheta}$

$\Gamma\hat{\Delta}O$: $\gamma_3 + 90^\circ + \gamma_4 = 180^\circ \Rightarrow \gamma_4 = 90^\circ - \gamma_3 = 90^\circ - \vartheta$

$\Rightarrow \boxed{\gamma_4 = 90^\circ - \vartheta}$

Analysing Vectors

$$\cos(\gamma_4) = \frac{W_T}{|\vec{w}|} \Rightarrow W_T = m \cdot g \cos(90^\circ - \vartheta)$$

$$\Rightarrow \boxed{W_T = m \cdot g \cdot \sin(\vartheta)}$$

$$\sin(\gamma_4) = \frac{W_N}{|\vec{w}|} \Leftrightarrow W_N = m \cdot g \cdot \sin(90^\circ - \vartheta)$$

$$\Rightarrow W_N = -m \cdot g \cdot \sin(\vartheta - 90^\circ) \Rightarrow \boxed{W_N = -m \cdot g \cdot \cos(\vartheta)}$$

$$\boxed{\vec{T} = 0\,\hat{t_o} + T_N\,\hat{N_o}}$$

$$\cos(\gamma s) = \frac{a_T}{|\vec{a}|} \Rightarrow \boxed{a_T = |\vec{a}| \cdot \cos(\theta)}$$

$$\sin(\gamma s) = \frac{a_N}{|\vec{a}|} \Rightarrow \boxed{a_N = |\vec{a}| \cdot \sin(\theta)}$$

Newtons Law

$$\Sigma F_T = m \cdot a_T \cancel{\Leftrightarrow T_N - m g \cos(\theta) \ldots |\vec{a}| \ldots (\theta)}$$

$$\Leftrightarrow W_T = m \cdot a_T \Leftrightarrow \cancel{m} \cdot g \cdot \sin(\theta) = \cancel{m} \cdot |\vec{a}| \cos(\theta)$$

$$\Rightarrow |\vec{a}| = g \cdot \frac{\sin\theta}{\cos\theta} \Rightarrow \boxed{|\vec{a}| = g \cdot \tan(\theta)} \quad (1)$$

$$\Sigma F_N = m \cdot a_N \Leftrightarrow T_N - m \cdot g \cdot \cos\theta = m \cdot |\vec{a}| \cdot \sin(\theta)$$

$$\Rightarrow T_N = m \cdot |\vec{a}| \sin\theta + m \cdot g \cdot \cos\theta$$

$$\Rightarrow T_N = m \cdot g \cdot \tan(\theta) \cdot \sin\theta + m \cdot g \cdot \cos\theta$$

$$\Rightarrow \boxed{T_N = m \cdot g \left[\tan(\theta) \cdot \sin(\theta) + \cos(\theta) \right]} \quad (2)$$

$$a_N = |\vec{a}| \sin(\theta) = \overbrace{g \cdot \tan(\theta)}^{|\vec{a}|} \cdot \sin(\theta) = \frac{|\vec{v}|^2}{R = L}$$

$$\Rightarrow \boxed{|\vec{v}| = \sqrt{L \cdot g \cdot \tan(\theta) \cdot \sin(\theta)}}$$

$$\cancel{|\vec{v}| = \ldots \Leftrightarrow |\vec{v}| = L \frac{\partial\theta}{\partial t}}$$

$$\cancel{\Leftrightarrow |\vec{v}| \, \partial t = L \, \partial\theta \Leftrightarrow |\vec{v}| \cdot \frac{\partial t}{\partial\theta} = L}$$

$$\cancel{\Leftrightarrow \ldots \frac{|\vec{v}|}{\partial\theta} = \frac{L}{\partial t}}$$

$$|\vec{v}| = \omega \cdot L = \frac{\partial \vartheta}{\partial t} \cdot L \iff L = \frac{\partial \vartheta}{\partial t} \cdot L \cdot \frac{1}{|\vec{v}|}$$

$$\iff \frac{1}{L} = \frac{\partial \vartheta}{\partial t} \cdot \frac{1}{|\vec{v}|} \iff \frac{1}{L} \cdot \partial t = \frac{1}{|\vec{v}|} \cdot \partial \vartheta$$

$$\iff \frac{1}{L} \partial t = \frac{\partial \vartheta}{\sqrt{L \cdot g \cdot \tan\vartheta \cdot \sin\vartheta}}$$

$$\iff \frac{1}{L} \int_0^t 1 \cdot \partial t = \int_{\vartheta(0)}^{\vartheta(t)} \frac{\partial \vartheta}{\sqrt{L g \tan\vartheta \sin\vartheta}}$$

$$\iff \frac{1}{L} \cdot t = \int_{\vartheta(0)}^{\vartheta(t)} \frac{\partial \vartheta}{L \cdot g \cdot \tan(\vartheta) \cdot \sin(\vartheta)}$$

$$= \dots = \boxed{\vartheta(t) = \dots}$$