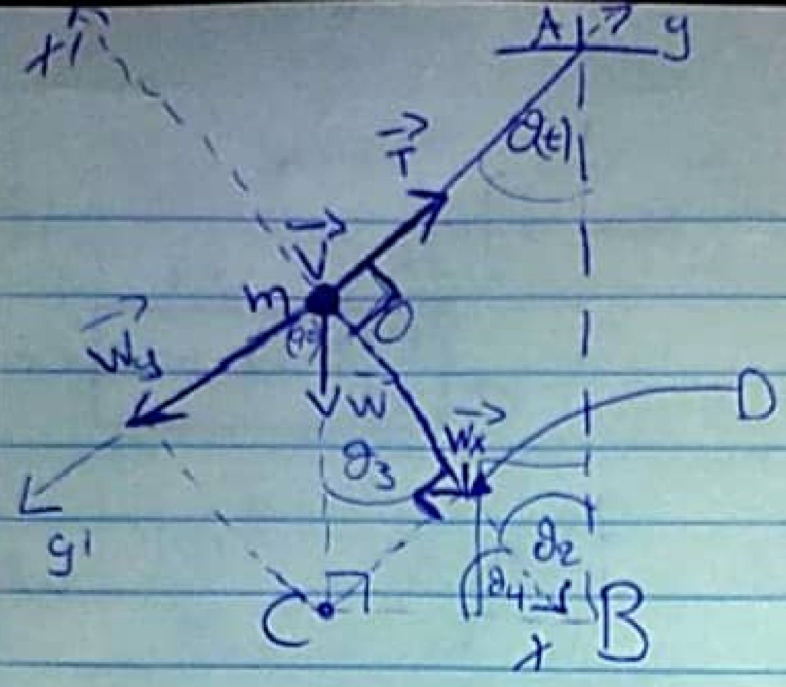

$\underline{\underline{OAB}}$: $90^\circ + \vartheta(t) + \vartheta_2 = 180^\circ \Leftrightarrow \vartheta_2 = 180^\circ - 90^\circ - \vartheta(t)$

$$\boxed{\vartheta_2 = 90^\circ - \vartheta(t)} \quad (1)$$

$\vartheta_2 + \vartheta_4 = 90^\circ \Leftrightarrow \vartheta_4 = 90^\circ - \vartheta_2 = \cancel{90^\circ} - \cancel{90^\circ} + \vartheta(t)$

$$\boxed{\vartheta_4 = \vartheta(t)} \quad (2)$$

OBC : $90^\circ + \vartheta_3 + \vartheta_4 = 180^\circ \Leftrightarrow \vartheta_3 = 180^\circ - 90^\circ - \vartheta_4$

$= 180^\circ - 90^\circ - \vartheta(t) \Rightarrow \boxed{\vartheta_3 = 90^\circ - \vartheta(t)} \quad (3)$

$\underline{\underline{O\hat{D}C}}$: $\cos(\vartheta_3) = \frac{W_x}{|\vec{W}|} \Rightarrow \boxed{W_x = |\vec{W}| \cdot \cos(\vartheta_3)} \quad (4)$

$\sin(\vartheta_3) = \frac{W_y}{|\vec{W}|} \Rightarrow \boxed{W_y = |\vec{W}| \cdot \sin(\vartheta_3)} \quad (5)$

$$\boxed{|\vec{W}| = m \cdot g} \quad (6)$$

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$$\vec{\Sigma F_y} = m\cdot\vec{a}_y \Leftrightarrow \vec{T} + \vec{W_y} = m\cdot\vec{a_y}$$

$$\Leftrightarrow T\cancel{\hat{y_0}} + m\cdot g\cdot\sin(\theta_3)\cancel{\hat{y_0}} = m\cdot a_y\cancel{\hat{y_0}}$$

$$\Leftrightarrow \frac{T}{m} + g\cdot\sin(\theta_3) = a_y$$

or $T = m\cdot a_y - m\cdot g\cdot\sin(\theta_3)$

$$T = m\left[a_y - g\cdot\sin(90^\circ - \theta(t))\right]$$

$$= m\left[a_y + g\cdot\sin(\theta(t) - 90^\circ)\right]$$

$$\Rightarrow \boxed{T(t) = m\left[a_y + g\cdot\cos(\theta(t))\right]} \quad (7)$$

Now what is a_y??? is it $a_y = a_N = \frac{|\vec{V}|^2}{R}$???
and if yes, why???