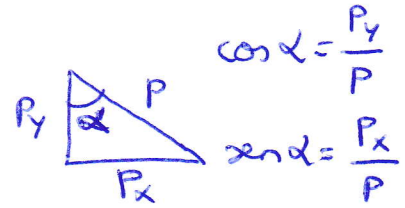


$$\vec{P} = P_x \vec{i} - P_y \vec{j}$$

$$\vec{N} = N \vec{j}$$

$$\vec{F}_R = -F_R \vec{i}$$



Según nuestro sistema de referencia

Eje X

$$\sum F_x = P_x - F_R = m \cdot a$$

$$P_x = P \cdot \text{xend} = m \cdot g \cdot \text{xend}$$

$$F_R = \mu_d \cdot N = \mu_d \cdot m \cdot g \cdot \cos \alpha$$

Eje Y

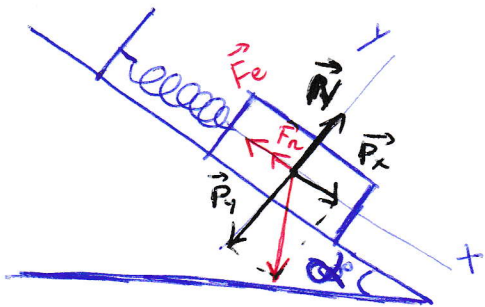
$$\sum F_y = N - P_y = 0$$

$$N = P_y$$

$$P_y = P \cdot \cos \alpha$$

$$\vec{F} = (m \cdot g \cdot \text{xend} - \mu_d \cdot m \cdot g \cdot \cos \alpha) \vec{i}$$

Si el cuerpo está unido a un muelle:



$$\vec{F}_e = -Kx \vec{i}$$

$$\vec{P} = P_x \vec{i} - P_y \vec{j}$$

$$\vec{N} = N \vec{j}$$

$$\vec{F}_R = -F_R \vec{i}$$

$$\sum \vec{F} = \vec{P} + \vec{N} + \vec{F}_e = (P_x - F_R - Kx) \vec{i} + (N - P_y) \vec{j}$$

$$\vec{F} = (m \cdot g \cdot \text{xend} - \mu_d \cdot m \cdot g \cdot \cos \alpha - Kx) \vec{i}$$

K = constante recuperadora del muelle

x = elongación