Embragues, frenos, coples y volantes de inercia

Embragues y frenos de tambor de expansión interna

$$M_f = \frac{f p_a b r}{\sin(\theta_a)} \int_{\theta_1}^{\theta_2} \sin(\theta)(r - a\cos(\theta))\, d\theta$$
$$M_n = \frac{p_a b r a}{\sin(\theta_a)} \int_{\theta_1}^{\theta_2} \sin^2(\theta)\, d\theta$$

$$A = \int_{\theta_1}^{\theta_2} \sin(\theta)\cos(\theta)\, d\theta = \left(\frac{1}{2}\sin^2(\theta)\right)\Big|_{\theta_1}^{\theta_2}$$
$$B = \int_{\theta_1}^{\theta_2} \sin^2(\theta)\, d\theta = \left(\frac{\theta}{2} - \frac{1}{4}\sin(2\theta)\right)\Big|_{\theta_1}^{\theta_2}$$

$$T = \frac{f p_a b r^2(\cos(\theta_1) - \cos(\theta_2))}{\sin(\theta_a)}$$

Caso I (fuerza $\rightarrow$ pasador)

$$F = \frac{M_n - M_f}{c}$$

$$R_x = \frac{p_a b r}{\sin(\theta_a)}(A - fB) - F_x$$
$$R_y = \frac{p_a b r}{\sin(\theta_a)}(B + fA) - F_y$$

Caso II (pasador $\rightarrow$ fuerza)

$$F = \frac{M_n + M_f}{c}$$

$$R_x = \frac{p_a b r}{\sin(\theta_a)}(A + fB) - F_x$$
$$R_y = \frac{p_a b r}{\sin(\theta_a)}(B - fA) - F_y$$

Embragues y frenos de contracción externa

$$M_f = \frac{f p_a b r}{\sin(\theta_a)} \int_{\theta_1}^{\theta_2} \sin(\theta)(r - a\cos(\theta))\, d\theta$$
$$M_n = \frac{p_a b r a}{\sin(\theta_a)} \int_{\theta_1}^{\theta_2} \sin^2(\theta)\, d\theta$$

$$A = \int_{\theta_1}^{\theta_2} \sin(\theta)\cos(\theta)\, d\theta = \left(\frac{1}{2}\sin^2(\theta)\right)\Big|_{\theta_1}^{\theta_2}$$
$$B = \int_{\theta_1}^{\theta_2} \sin^2(\theta)\, d\theta = \left(\frac{\theta}{2} - \frac{1}{4}\sin(2\theta)\right)\Big|_{\theta_1}^{\theta_2}$$

$$T = \frac{f p_a b r^2(\cos(\theta_1) - \cos(\theta_2))}{\sin(\theta_a)}$$

Caso I (fuerza $\rightarrow$ pasador)

$$F = \frac{M_n + M_f}{c}$$

$$R_x = \frac{p_a b r}{\sin(\theta_a)}(A + fB) - F_x$$
$$R_y = \frac{p_a b r}{\sin(\theta_a)}(fA - B) + F_y$$

Caso II (pasador $\rightarrow$ fuerza)

$$F = \frac{M_n - M_f}{c}$$

$$R_x = \frac{p_a b r}{\sin(\theta_a)}(A - fB) - F_x$$
$$R_y = \frac{p_a b r}{\sin(\theta_a)}(-fA - B) + F_y$$