FRENI A NASTRO

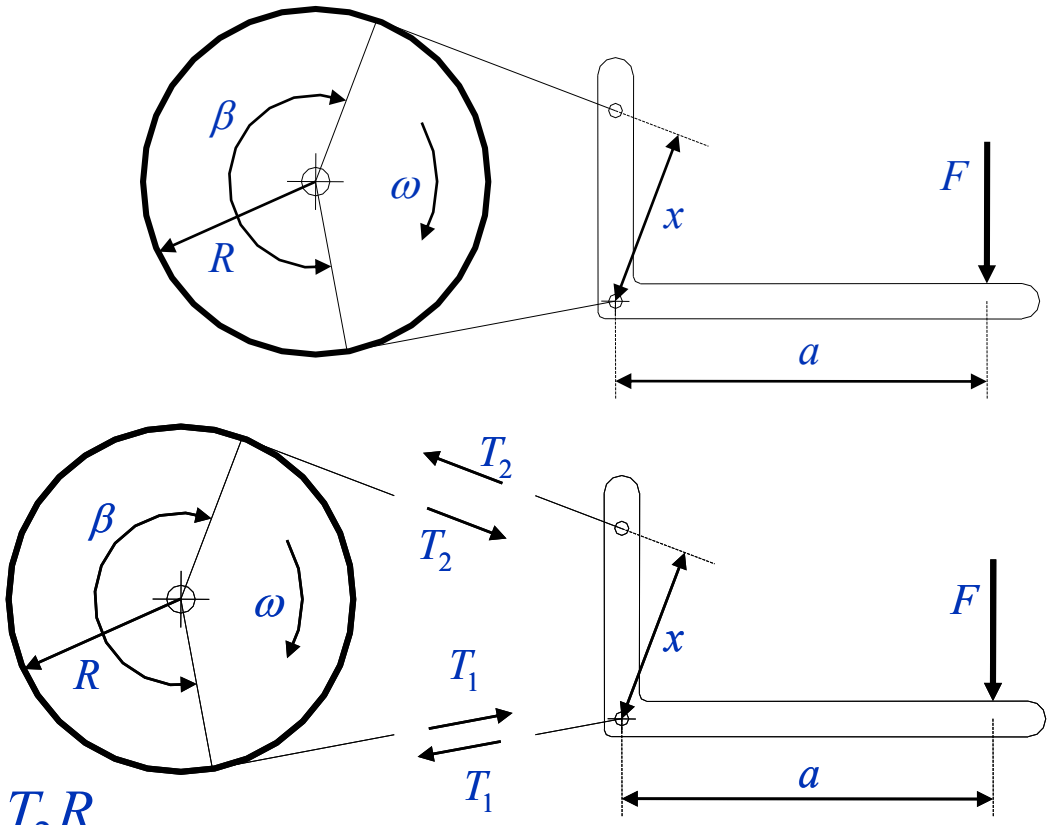
brakes tape

Freni a nastro

Freno ordinario

Brake ordinary

con rotazione del tamburo in verso orario:



$$\frac{T_1}{T_2} = e^{f\beta}$$

coppia frenante :

$$C_f = (T_1 - T_2)R = (e^{f\beta} - 1)T_2 R$$

equilibrio della leva:

balance of the lever

$$T_2 = F\frac{a}{x} \quad \Rightarrow \quad C_f = F\,R\frac{a}{x}(e^{f\beta} - 1)$$

Freni a nastro

Freno ordinario

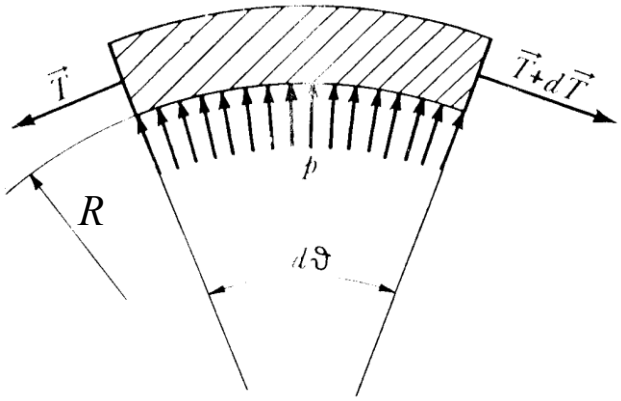
Brake ordinary

Distribuzione delle pressioni fra nastro e tamburo

$$\left[T+\left(T+dT\right)\right]\frac{d\vartheta}{2}=p\,b\,R\,d\vartheta$$

e quindi trascurando gli infinitesimi di ordine superiore:

$$p=\frac{T}{bR}$$



pressione massima:

$$p_{\max}=\frac{T_1}{bR}=\frac{e^{f\beta}C_f}{bR^2\left(e^{f\beta}-1\right)}$$

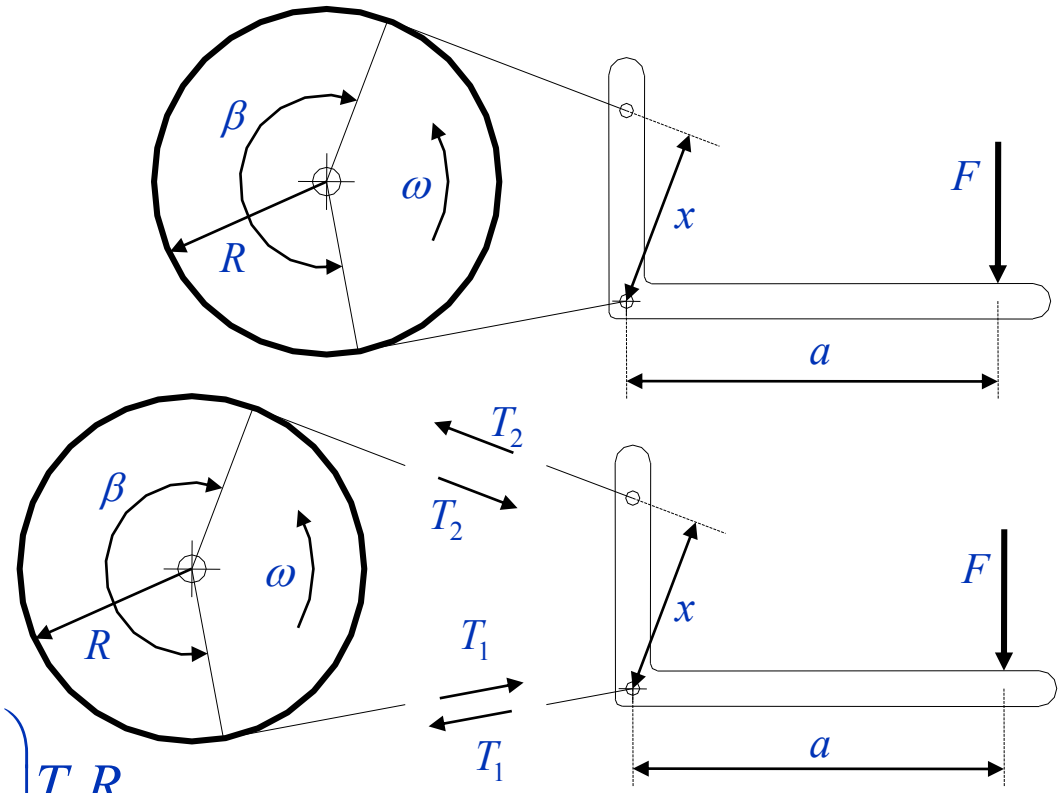
Freni a nastro

Freno ordinario

Brake ordinary

con rotazione del tamburo in verso antiorario:

$$\frac{T_2}{T_1} = e^{f\beta}$$



coppia frenante:

$$C_f = (T_2 - T_1)R = \left(\frac{e^{f\beta} - 1}{e^{f\beta}}\right) T_2 R$$

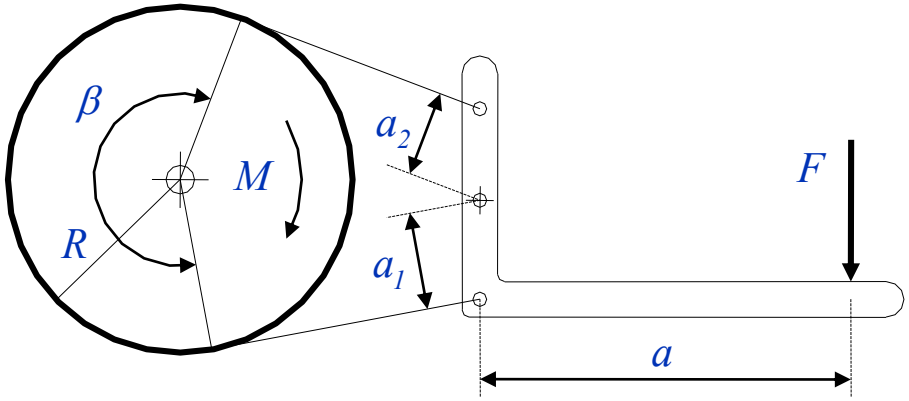
equilibrio della leva:

$$T_2 = \frac{Fa}{x} \qquad \Rightarrow \qquad C_f = F\,R\,\frac{a}{x}\left(\frac{e^{f\beta} - 1}{e^{f\beta}}\right)$$

Freni a nastro

Freno differenziale

Differential brake

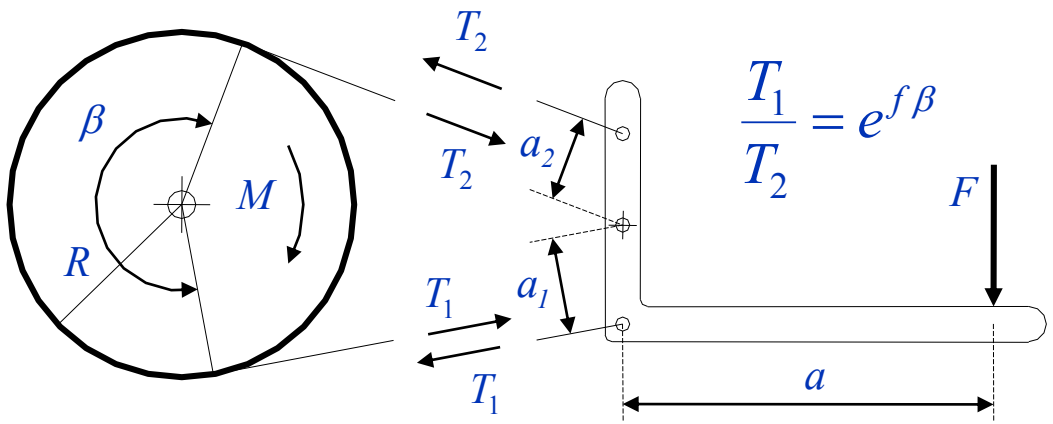


equilibrio del tamburo:

$$M = (T_1 - T_2)R = \left(e^{f\beta} - 1\right)T_2 R$$

equilibrio della leva:

$$F\,a = T_2 a_2 - T_1 a_1$$



e quindi:

$$F = \frac{M\left(a_2 - a_1 e^{f\beta}\right)}{a\,R\left(e^{f\beta} - 1\right)}$$

Freni ad azione spontanea, se: $\left(a_2 = a_1 e^{f\beta}\right) \Rightarrow F = 0$