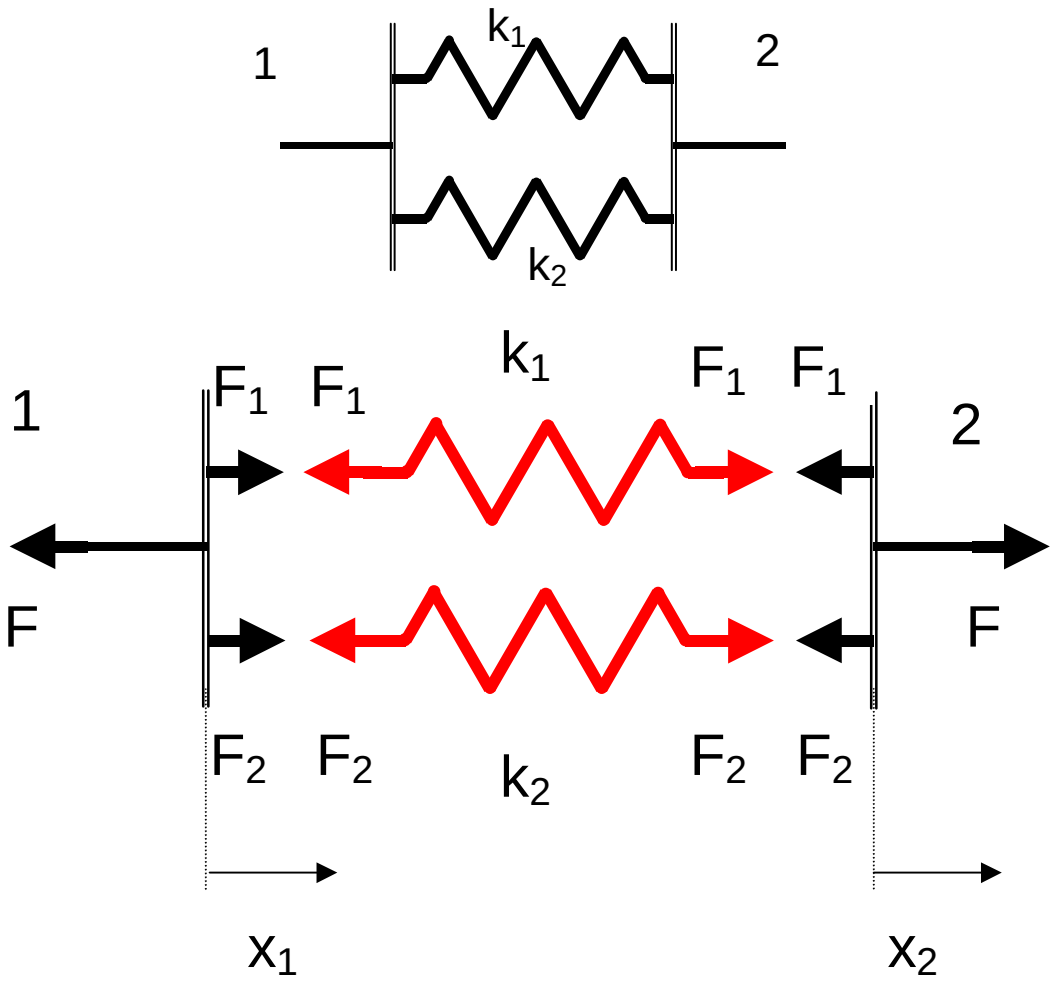
Combinaisons de ressorts

Ressorts en 'parallèle'



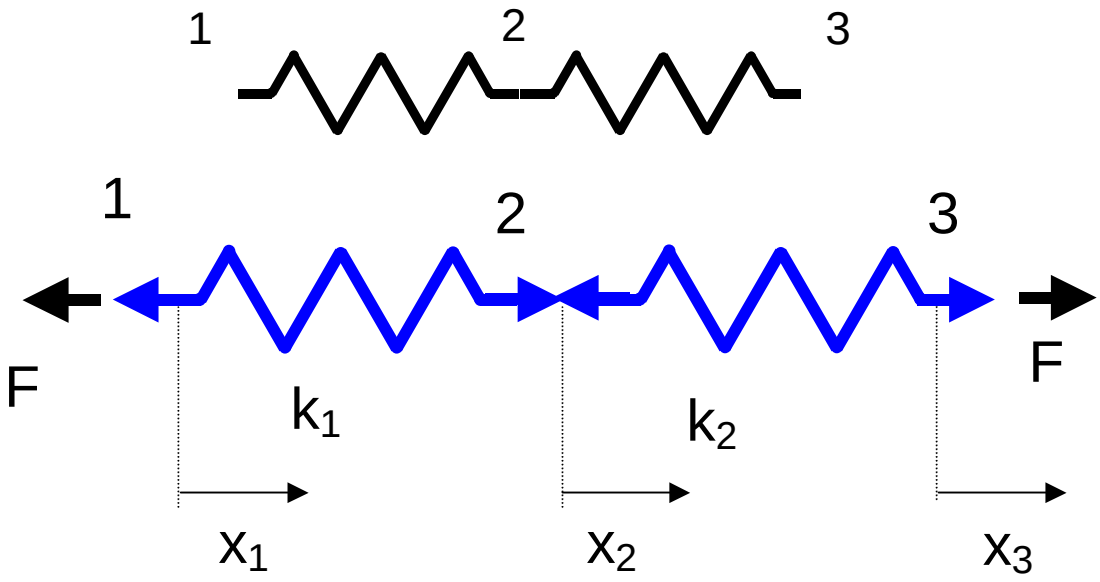
$$F_1 = k_1(x_2 - x_1)$$

$$F_2 = k_2(x_2 - x_1)$$

$$F = (k_1 + k_2)(x_2 - x_1)$$
$$= k_{éq.}(x_2 - x_1)$$

$$\boxed{k_{eq} = k_1 + k_2}$$

Ressorts en 'série'



$$F = k_{éq.}(x_3 - x_1)$$

$$F = k_1(x_2 - x_1)$$

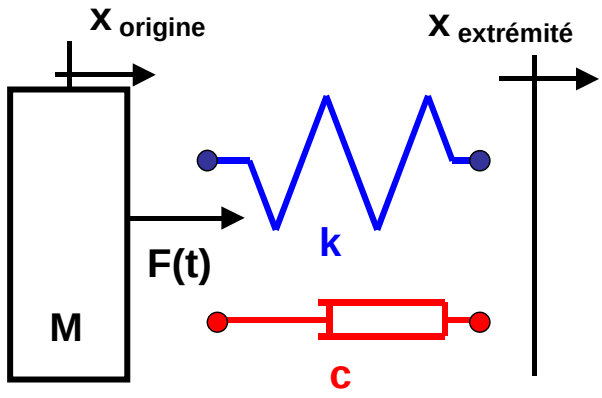
$$F = k_2(x_3 - x_2)$$

$$x_2 = \frac{F}{k_1} + x_1 = -\frac{F}{k_2} + x_3$$

$$x_3 - x_1 = \frac{F}{k_1} + \frac{F}{k_2} = F\left(\frac{1}{k_1} + \frac{1}{k_2}\right)$$

$$\boxed{\frac{1}{k_{éq.}} = \frac{1}{k_1} + \frac{1}{k_2}}$$

(Masse) => origine



$$M\,X^{\infty}_{origine} = k\,(X_{extrémité} - X_{origine}) + \ldots$$