
EPFL Ecole polytechnique fédérale de Lausanne
Actionneurs et Systèmes Electromagnétiques II
CLASSIFICATION
20 02 2025
Prof. Yves Perriard

Classification

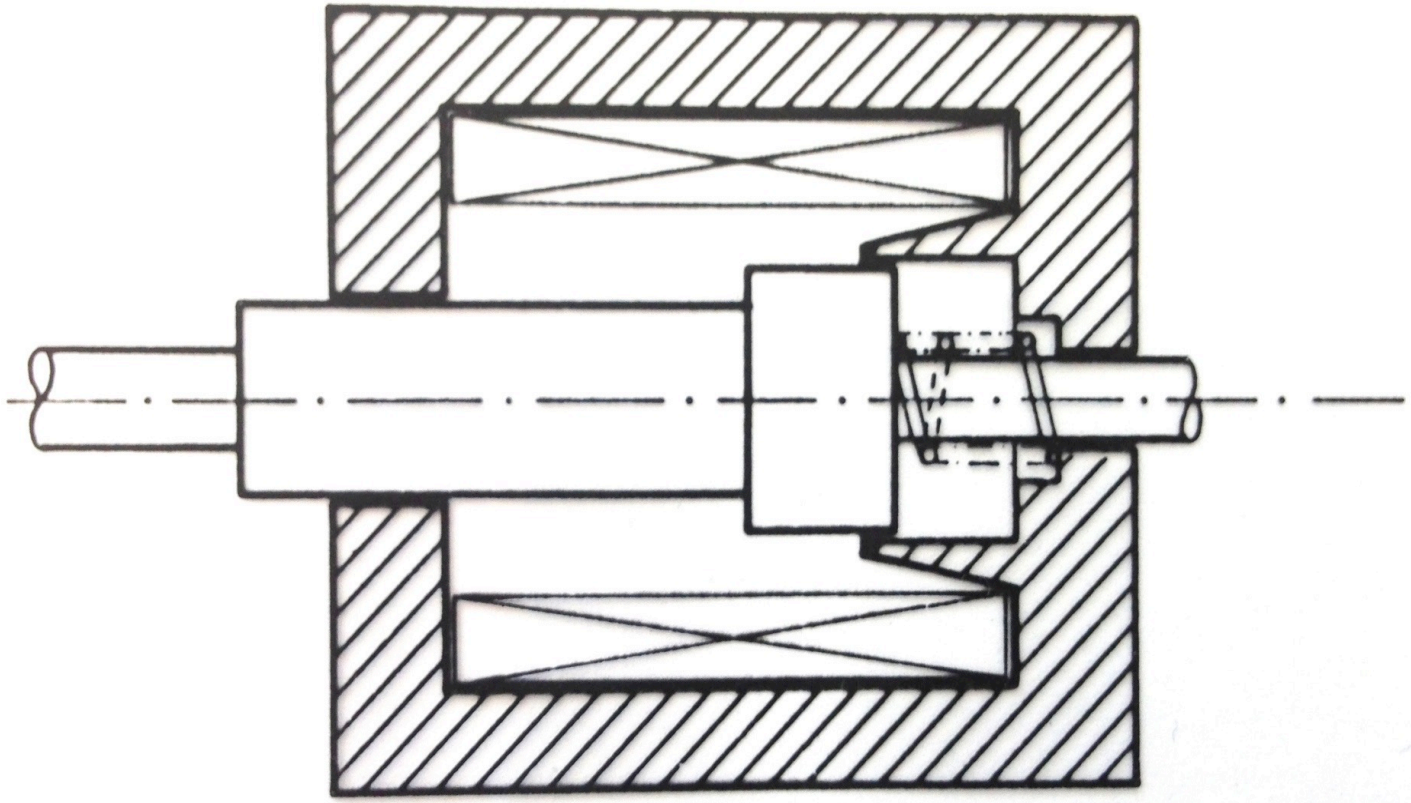
Bobine (b) – aimant (a)

$$F_x = \underbrace{\frac{1}{2}\frac{dL_b}{dx} i_b^2}_{\text{Réluctant}} + \underbrace{\frac{1}{2}\frac{d\Lambda_a}{dx}\theta_a^2 + \frac{dL_{ab}}{dx} i_b \theta_a}_{\text{Electrodynamique}}$$

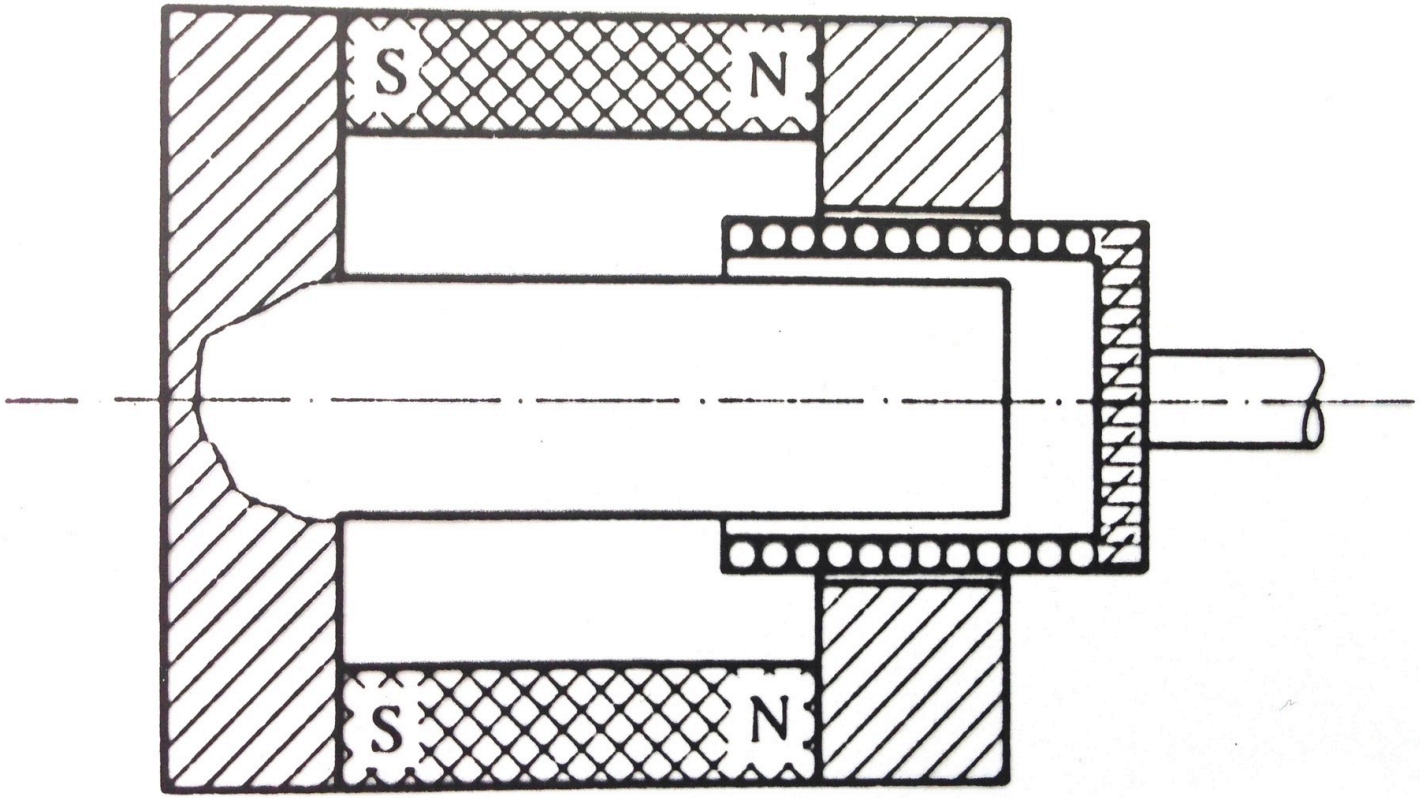
Electromagnétique

Réluctant polarisé (hybride)

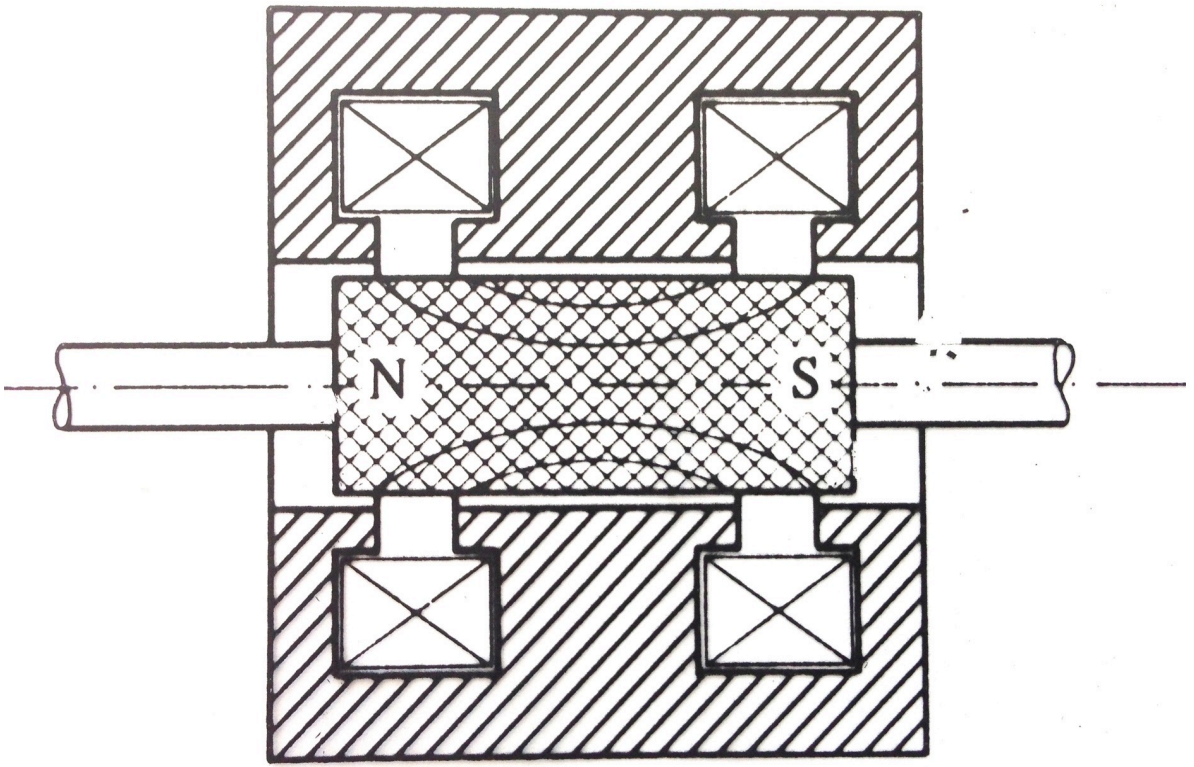
Reluctant system



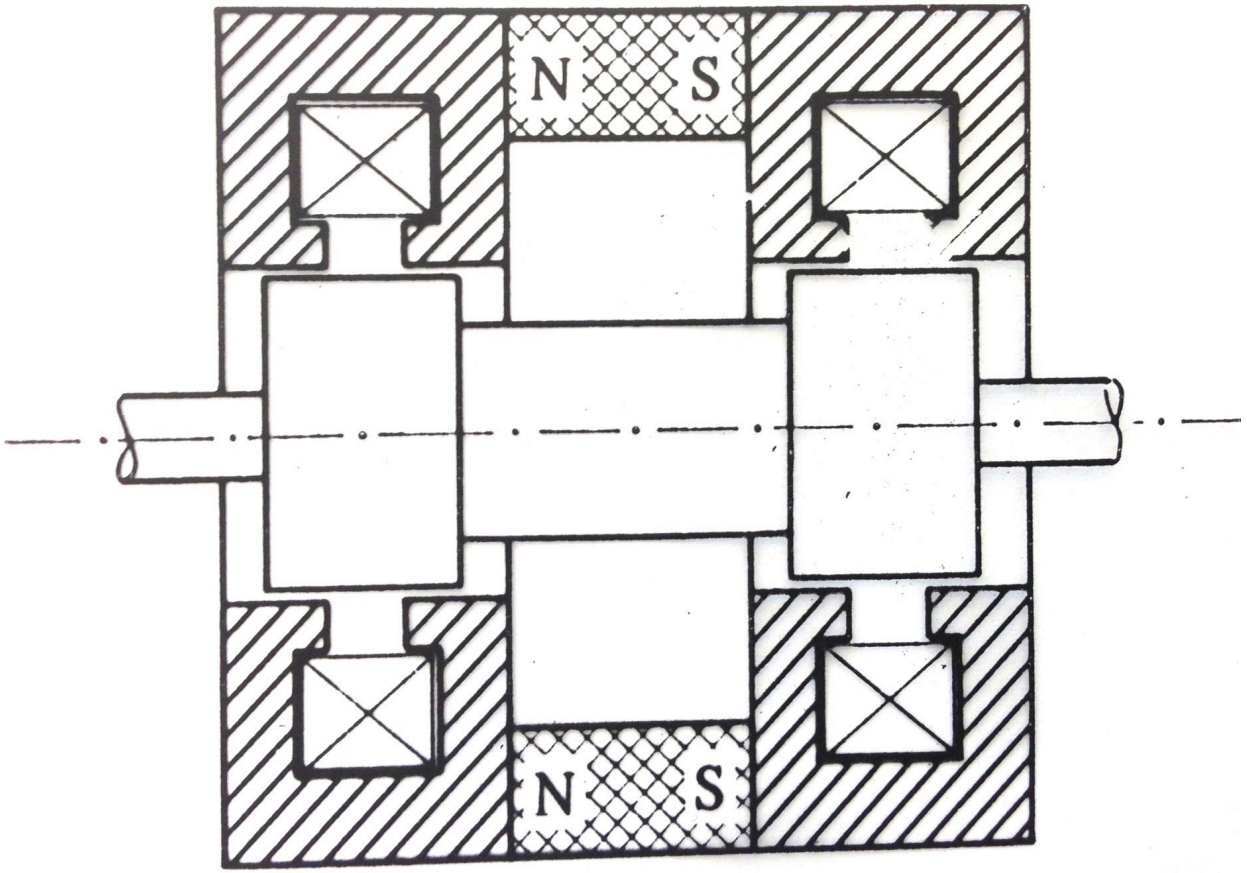
Voice-coil system



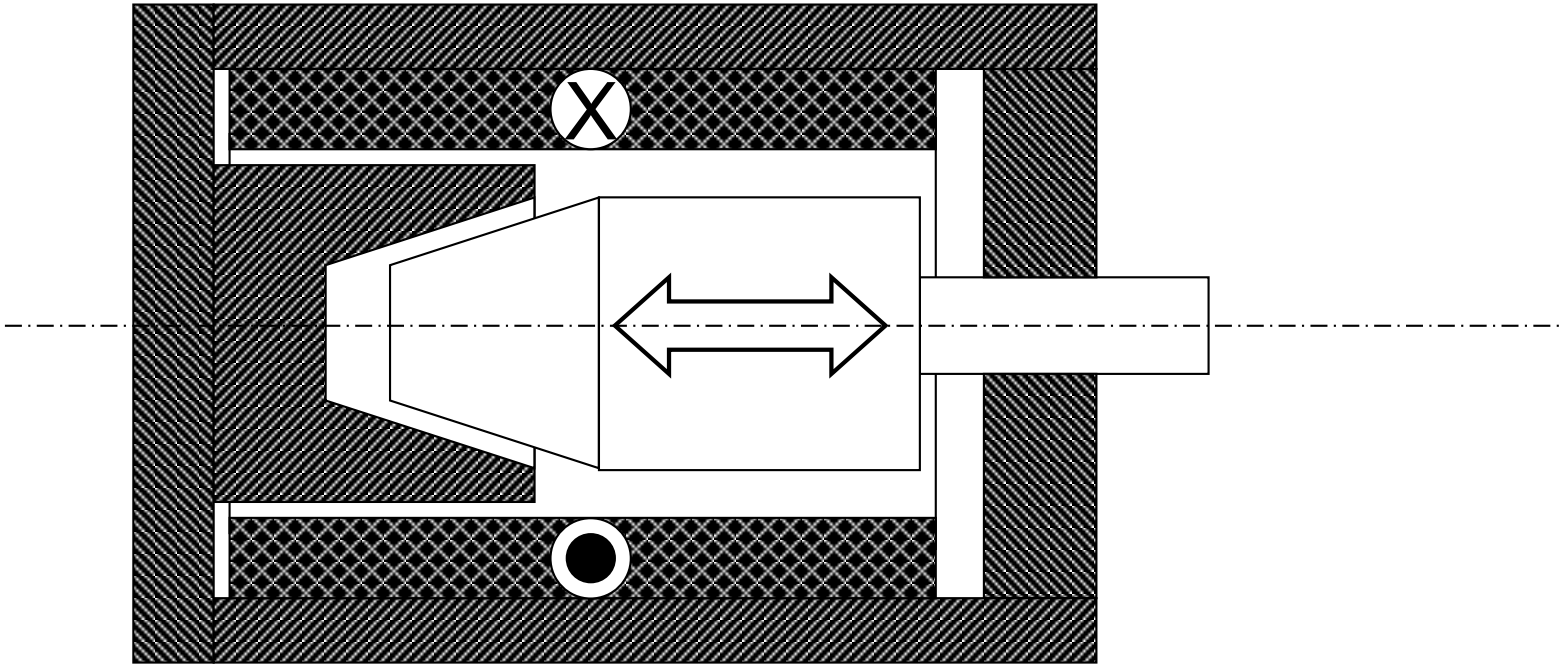
Moving Magnet system



Hybrid system or stepper



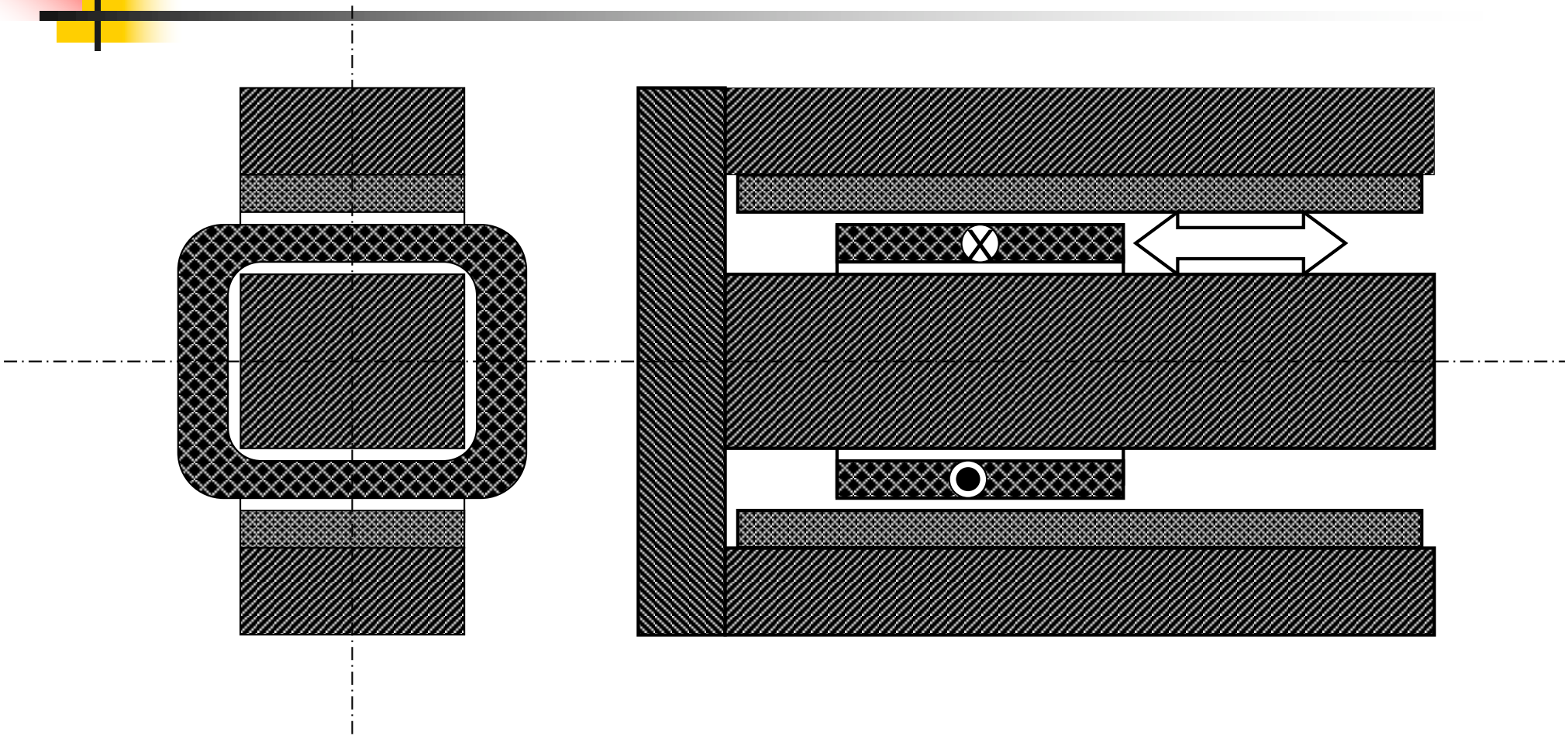
Actionneur réluctant



$$F_x = \frac{1}{2}\frac{dL_b}{dx}i_b^2$$

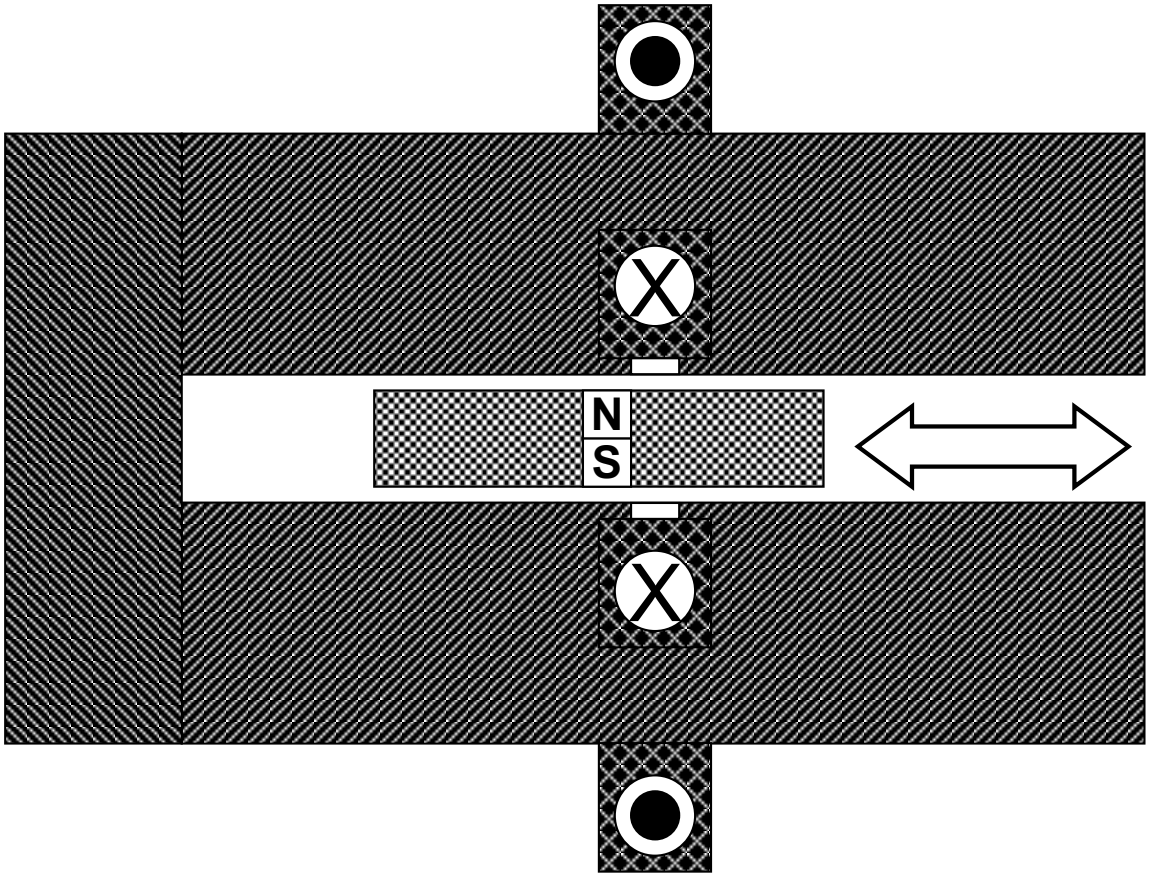
Reluctant system

Actionneur électrodynamique



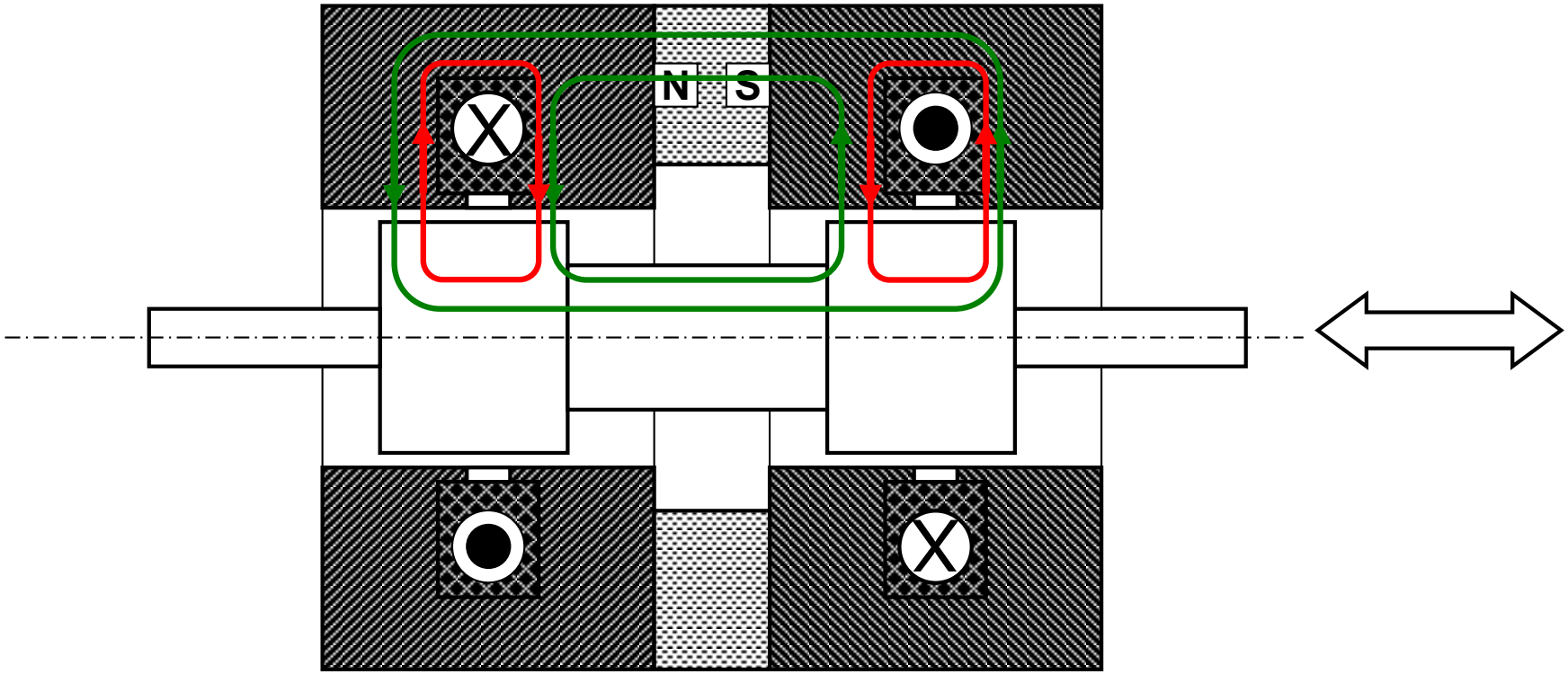
$$F_x = \frac{dL_{ab}}{dx} i_b \theta_a$$

Actionneur électromagnétique



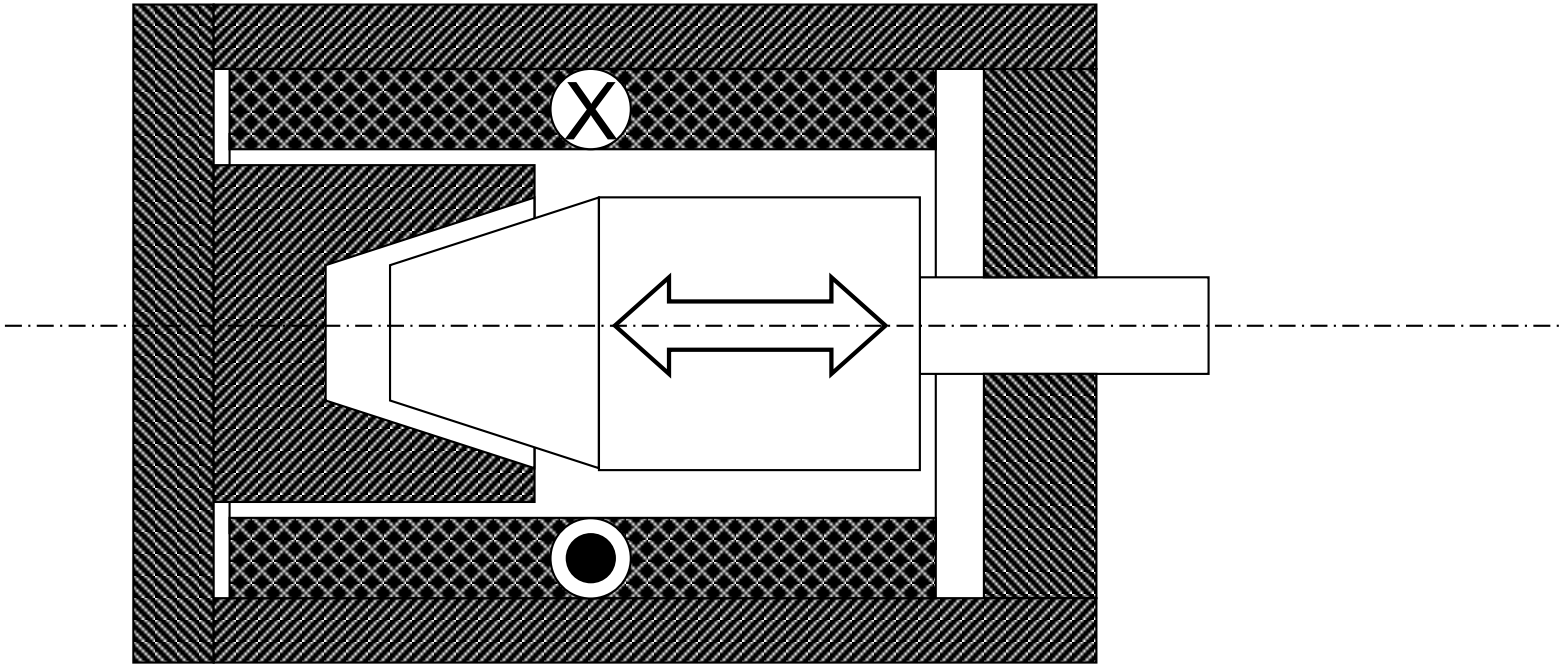
$$F_x = \frac{1}{2}\frac{d\Lambda_a}{dx}\theta_a^2 + \frac{dL_{ab}}{dx} i_b \theta_a$$

Actionneur réluctant polarisé (hybride)



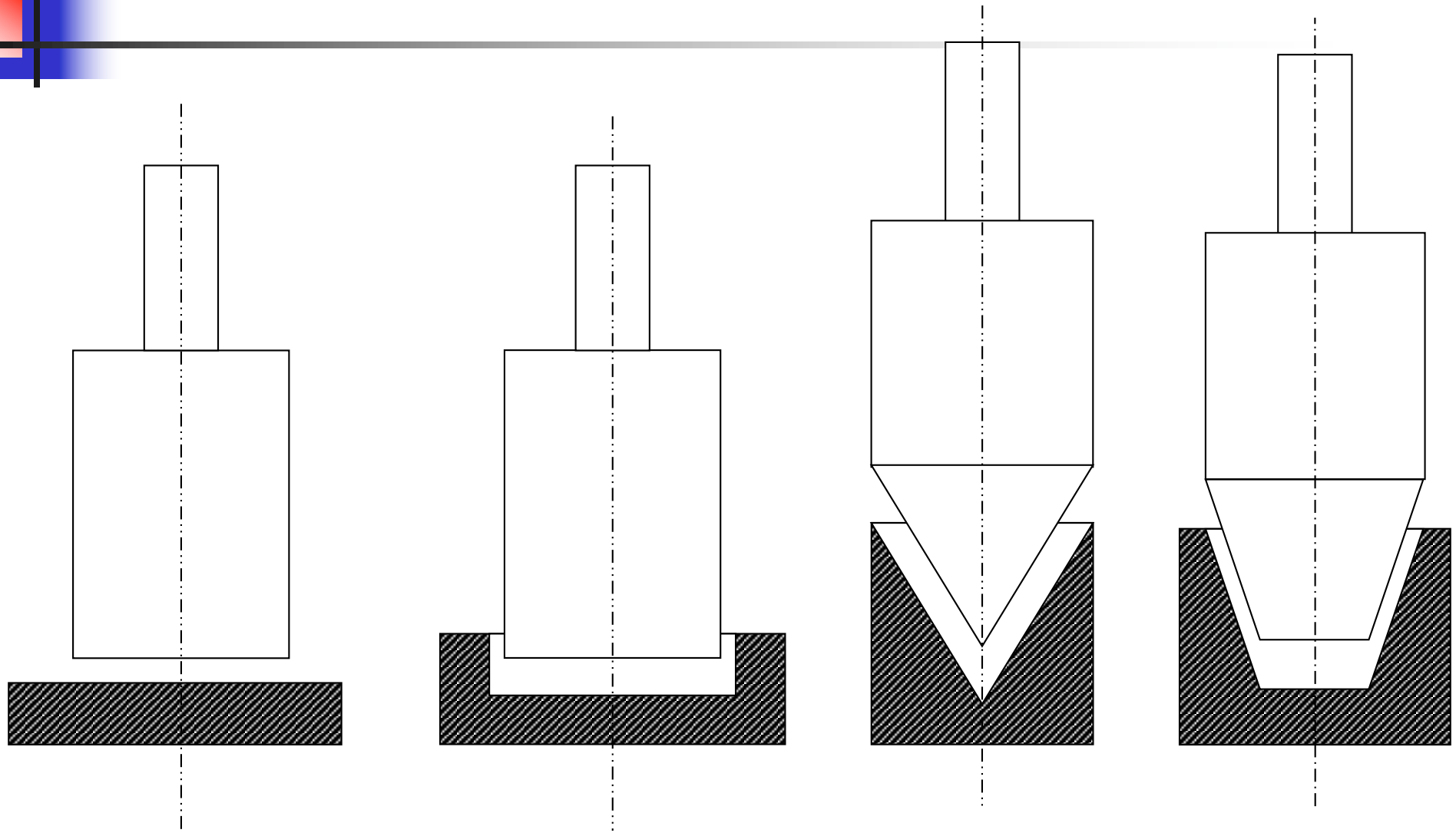
$$F_x = \frac{1}{2}\frac{dL_b}{dx}i_b^2 + \frac{1}{2}\frac{d\Lambda_a}{dx}\theta_a^2 + \frac{dL_{ab}}{dx}i_b\theta_a$$

Actionneur réluctant

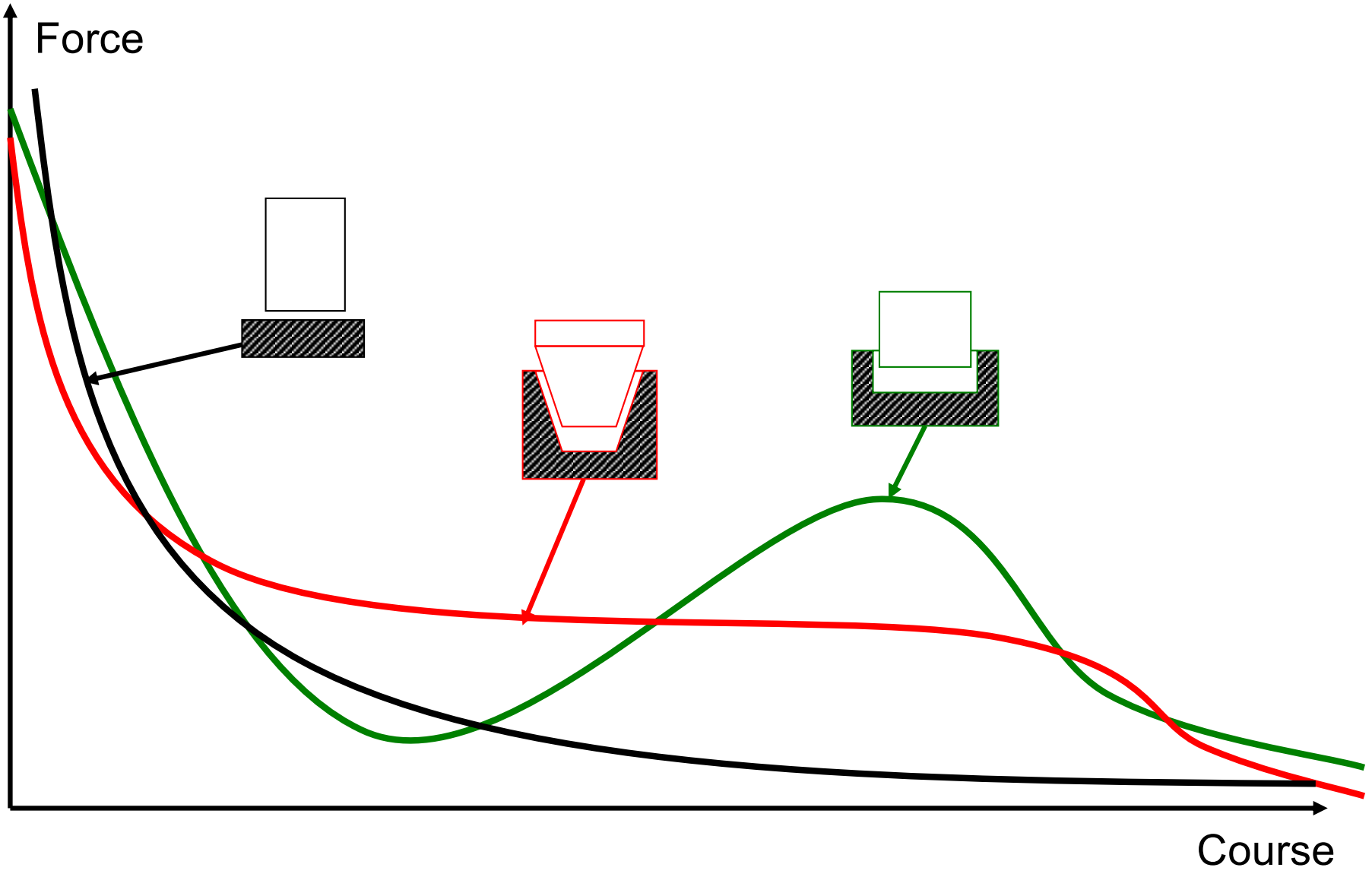


$$F_x = \frac{1}{2}\frac{dL_b}{dx}i_b^2$$

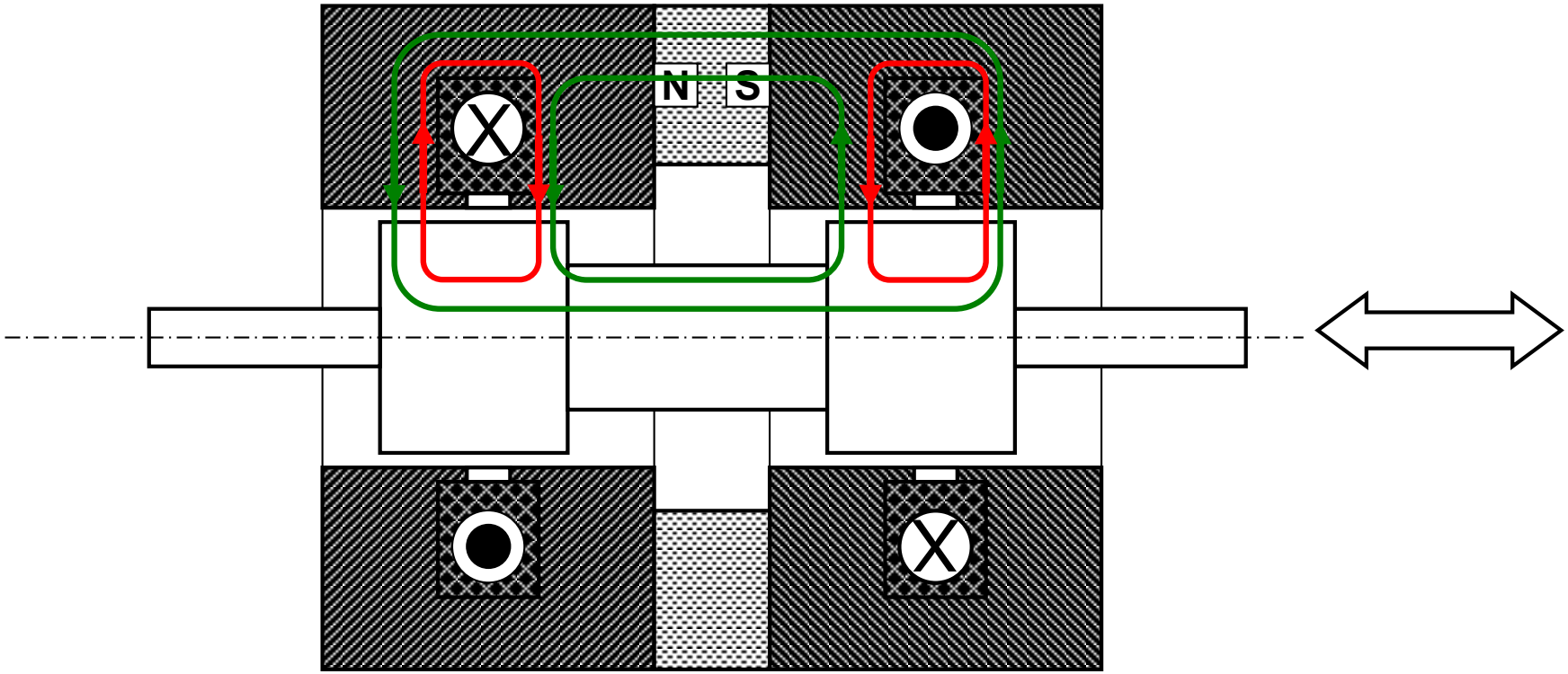
Actionneurs réluctants - structure



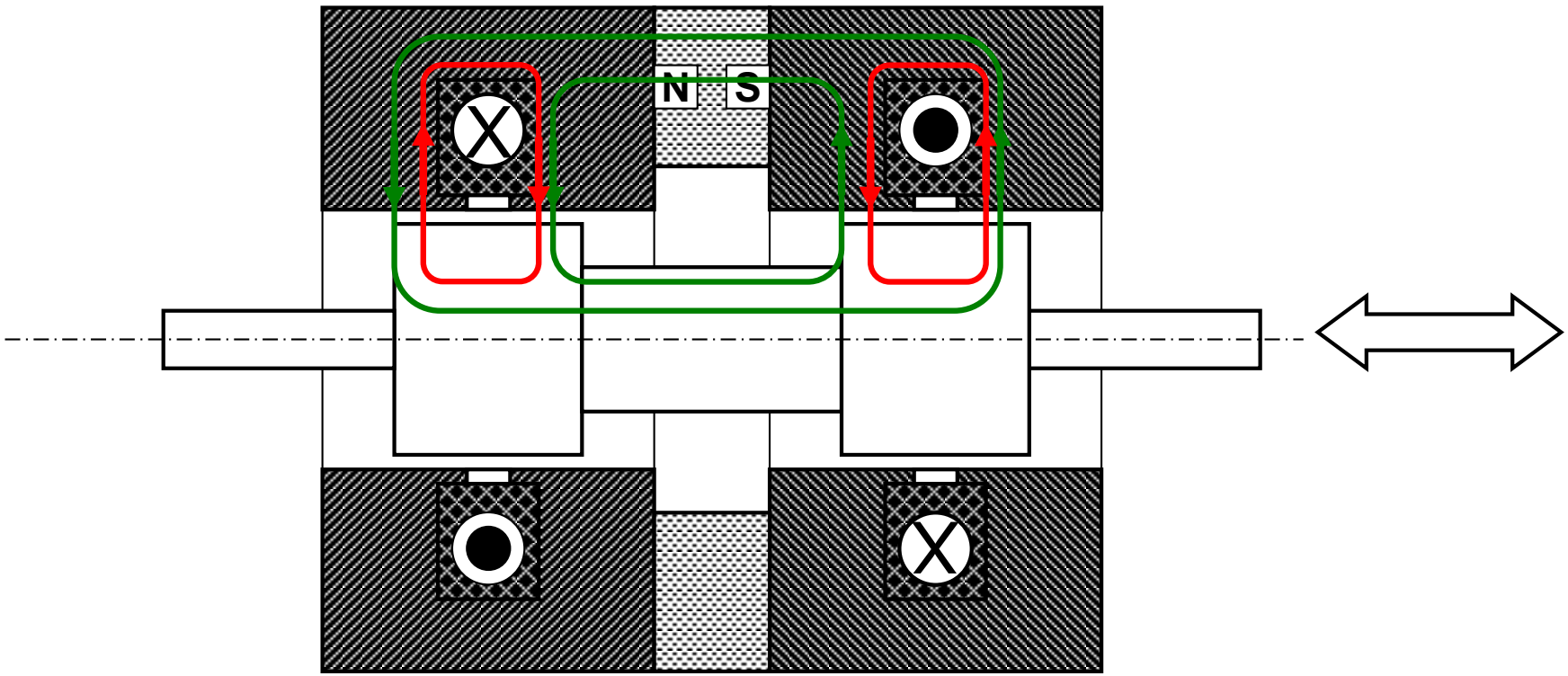
Actionneurs réluctants
caractéristiques de force

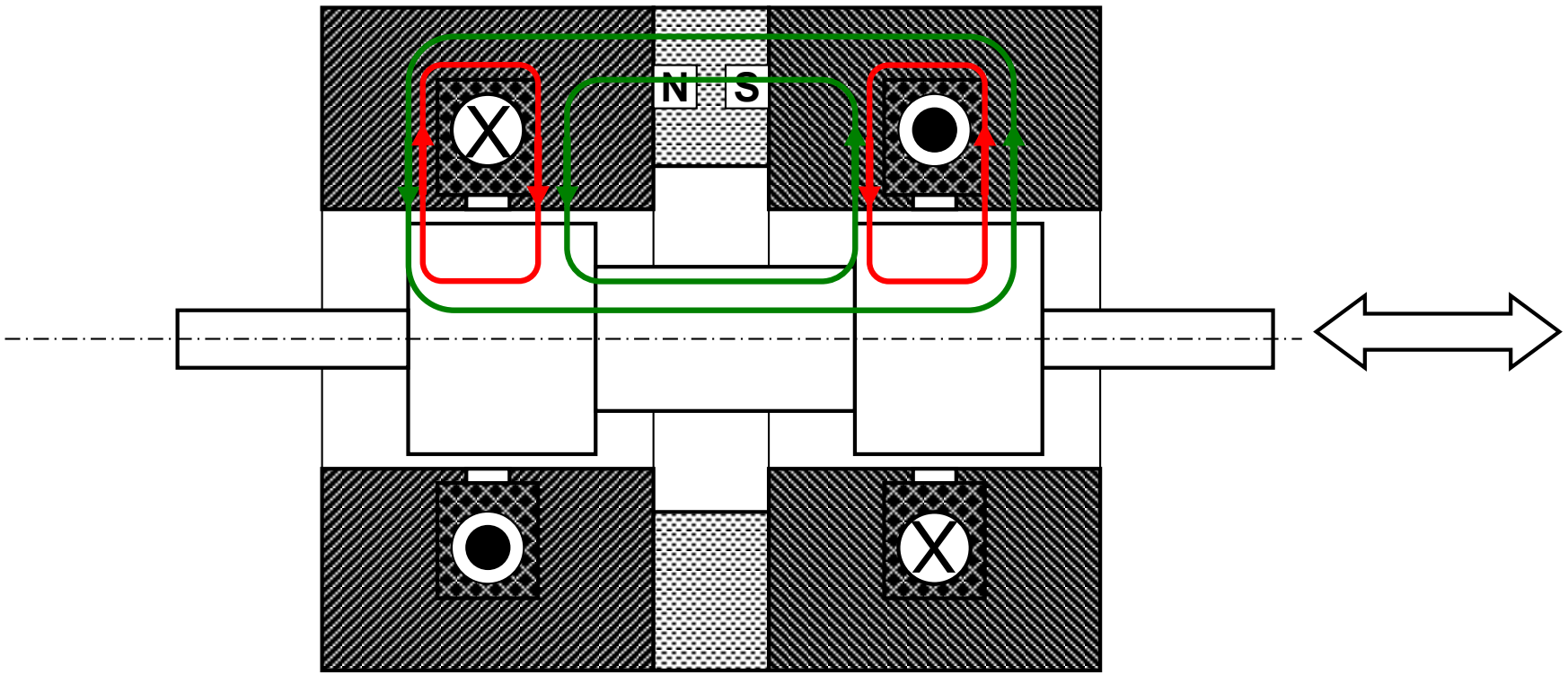


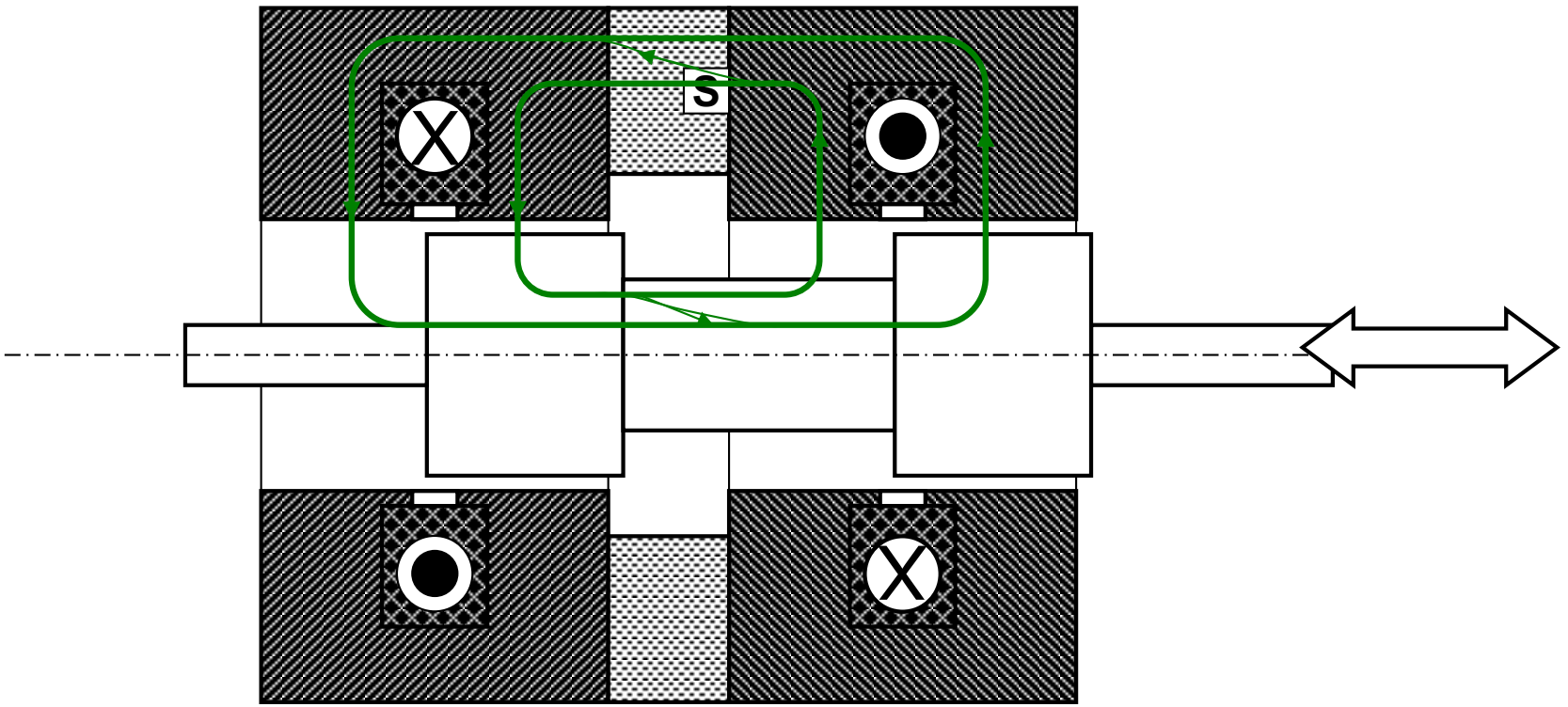
Actionneur réluctant polarisé (hybride)

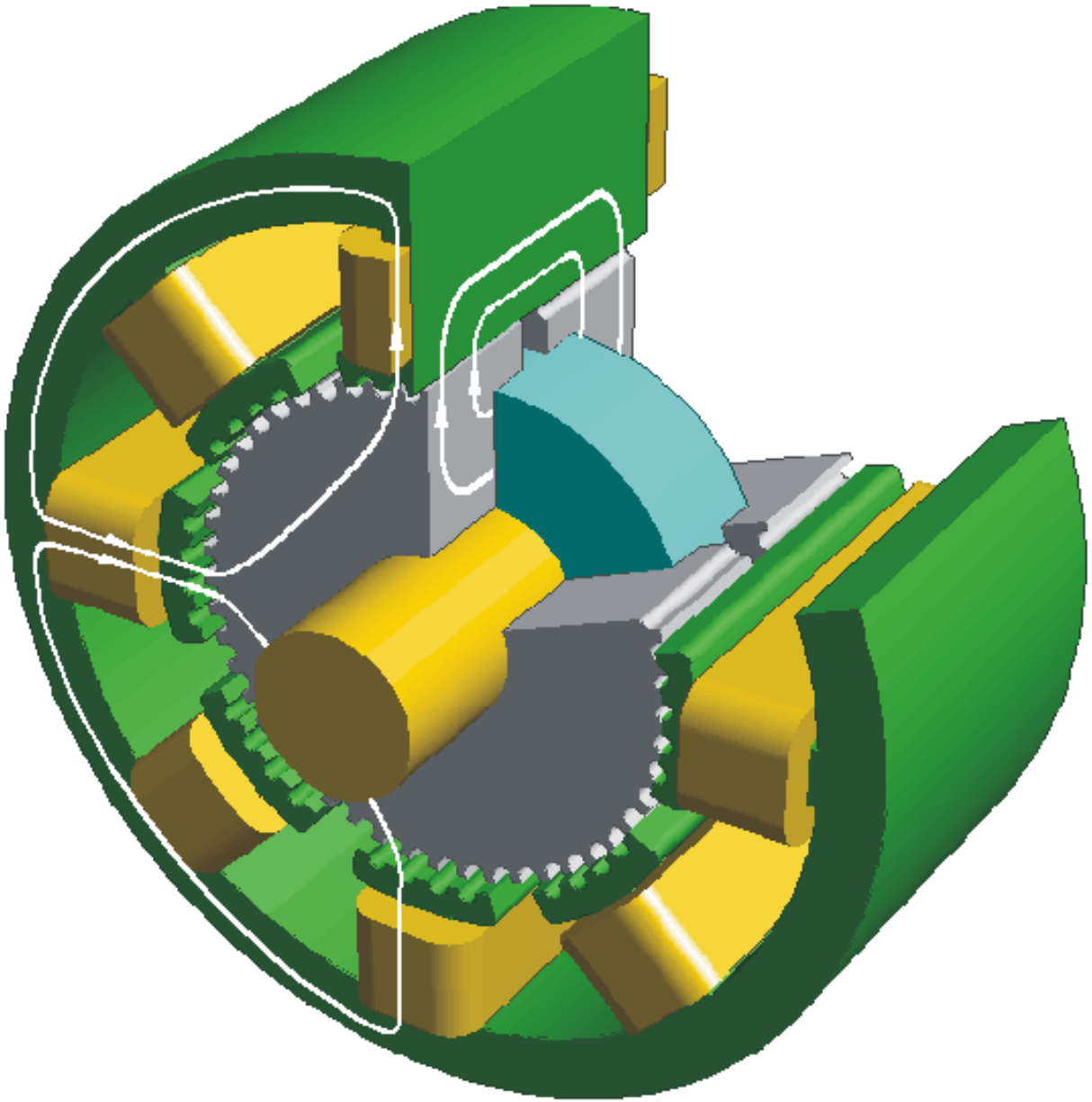


$$F_x = \frac{1}{2}\frac{dL_b}{dx}i_b^2 + \frac{1}{2}\frac{d\Lambda_a}{dx}\theta_a^2 + \frac{dL_{ab}}{dx}i_b\theta_a$$


N
S

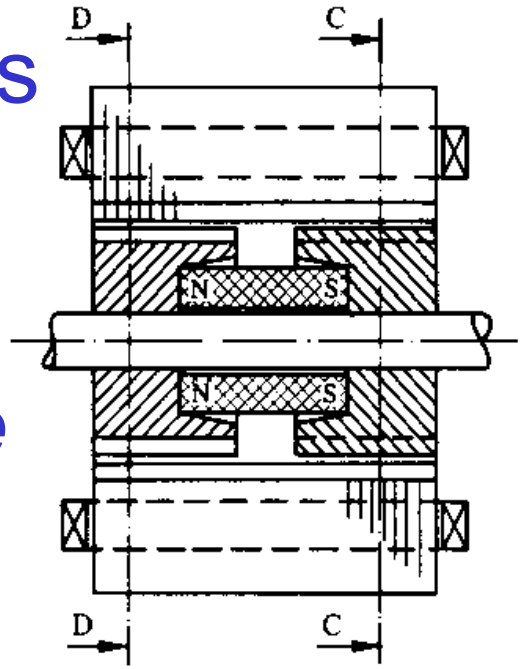

N
S


S

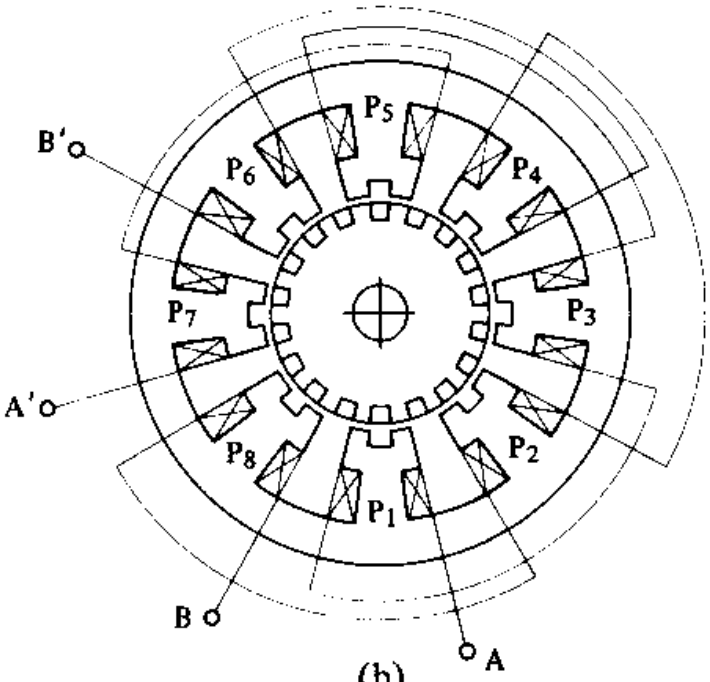


Moteur pas à pas hybride

Circuit magnétique équivalent



(a)



(b)