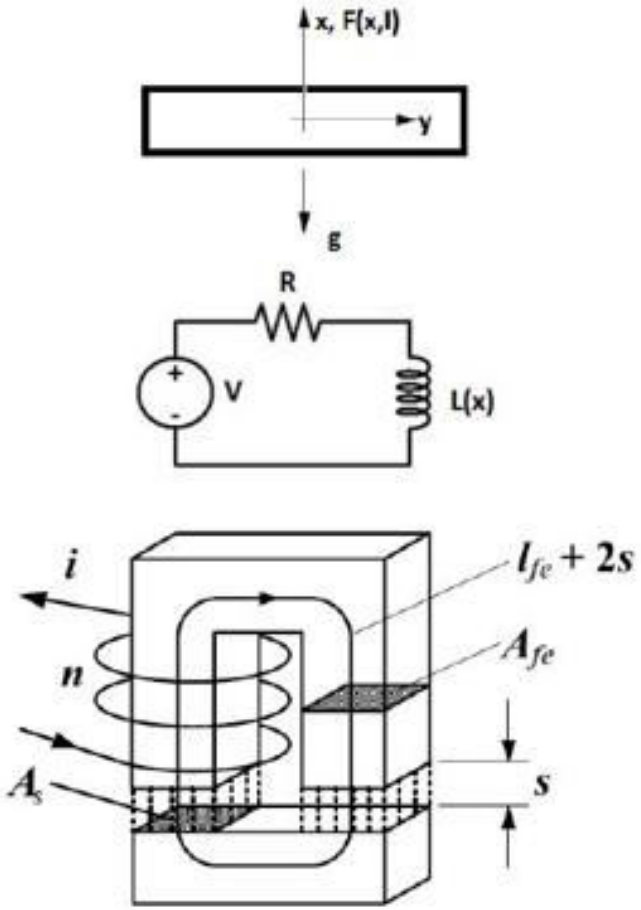
MODEL OF THE ELECTROMECHANICAL SYSTEM



The reference system is set with the origin in the equilibrium position at distance δ from the magnet with x positive upwards (see figure).

We split the whole system in 2 parts:

- the mechanical part (equation of motion)

$$m\ddot{x} = F - mg$$

- the electrical part

$$V = RI + \frac{dL}{dt}$$

$$F = \mu_0 A_s N^2 \frac{I^2}{\left[\frac{L_{fe}}{\mu_r} + 2(\delta_0 - x)\right]^2}$$