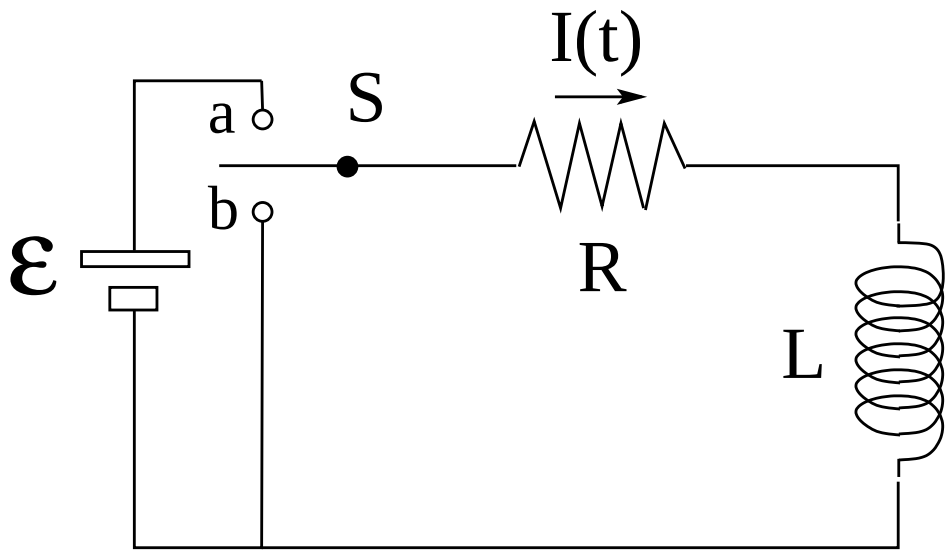
RL Circuit: Fundamentals

Specifications:

- $\mathcal{E}$ (emf)
- R (resistance)
- L (inductance)

Switch S:

- a: current buildup
- b: current shutdown



Time-dependent quantities:

- $I(t)$: instantaneous current through inductor
- $\dfrac{dI}{dt}$: rate of change of instantaneous current
- $V_R(t) = I(t)R$: instantaneous voltage across resistor
- $V_L(t) = L\,\dfrac{dI}{dt}$: instantaneous voltage across inductor