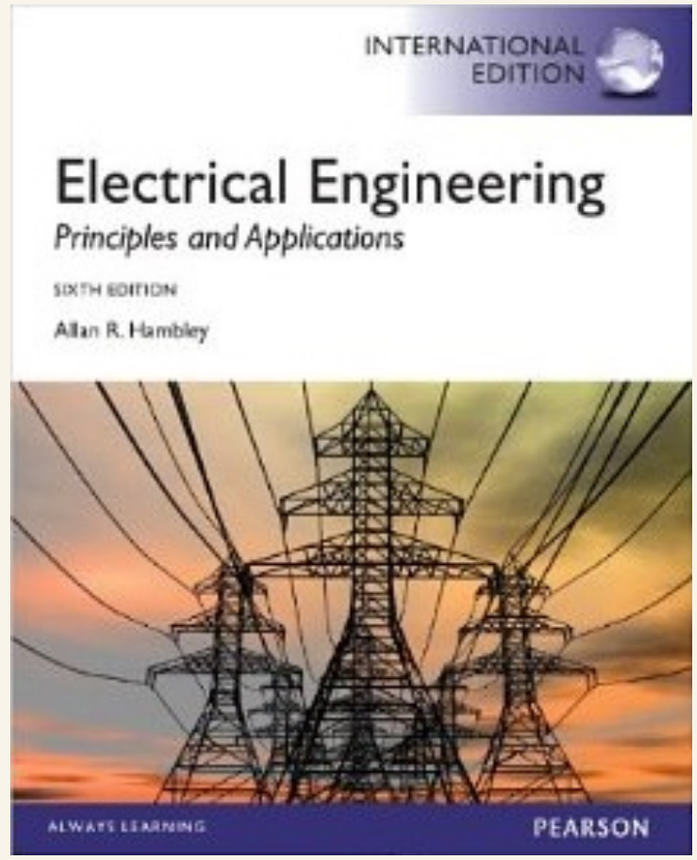
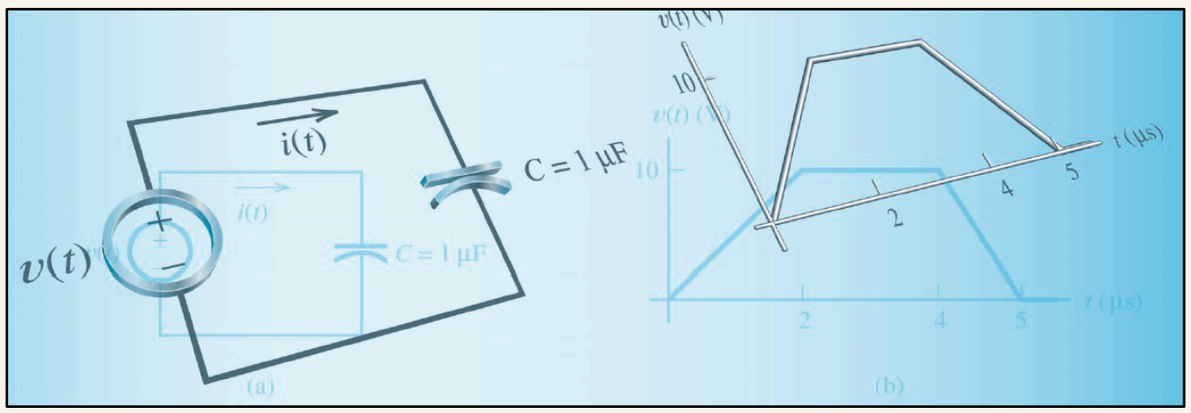
Capacité et inductance

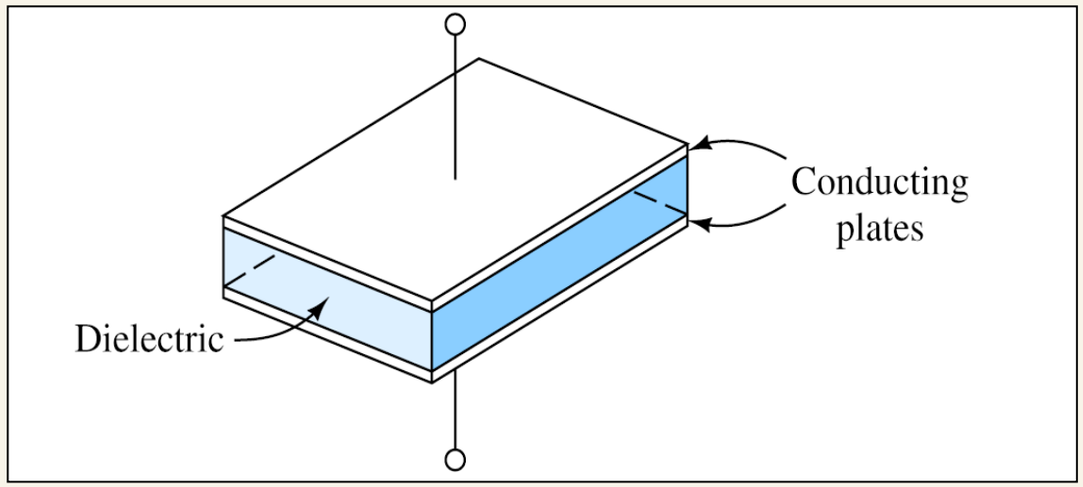
- Capacité
- Capacités en série et en parallèle
- Inductance
- Inductances en série et en parallèle





Chap 3

Capacité



$$q = Cv$$

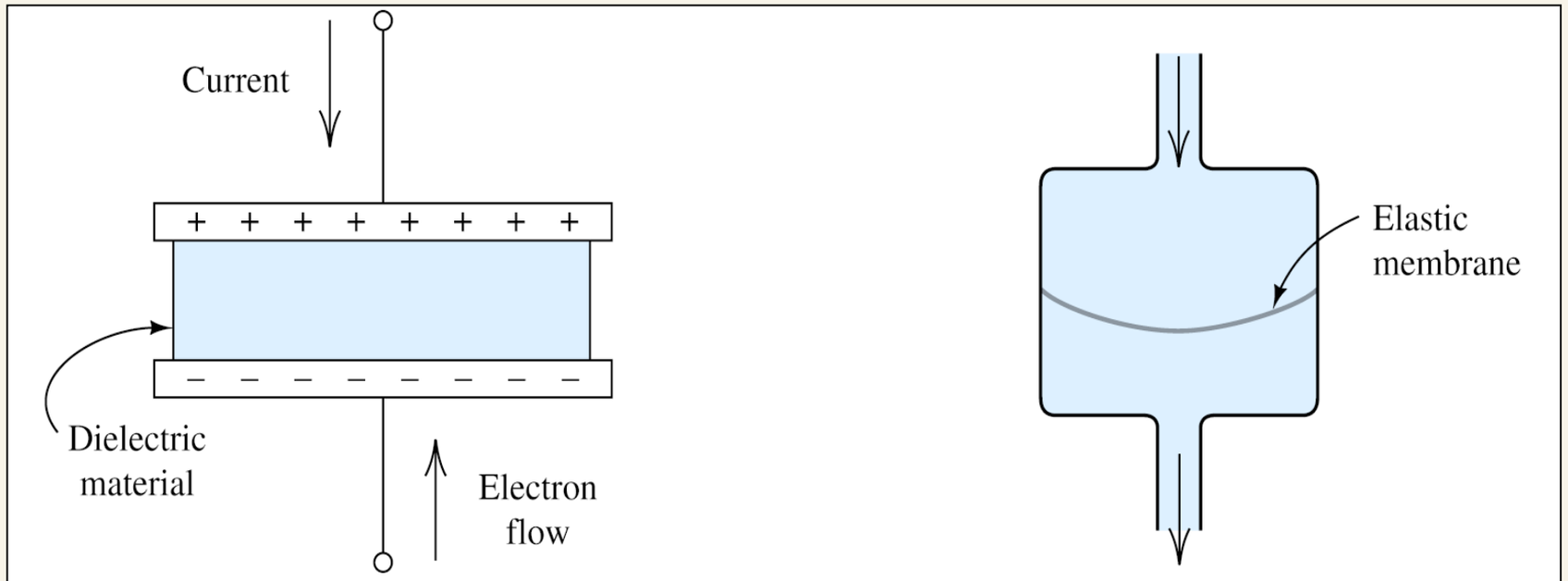
$$i = \frac{dq}{dt} = C\frac{dv}{dt}$$

$$q(t) = \int_{t_0}^{t} i(t)dt + q(t_0)$$

$$v(t) = \frac{1}{C}\int_{t_0}^{t} i(t)dt + v(t_0)$$

$$w(t) = \frac{1}{2}Cv^2(t)$$

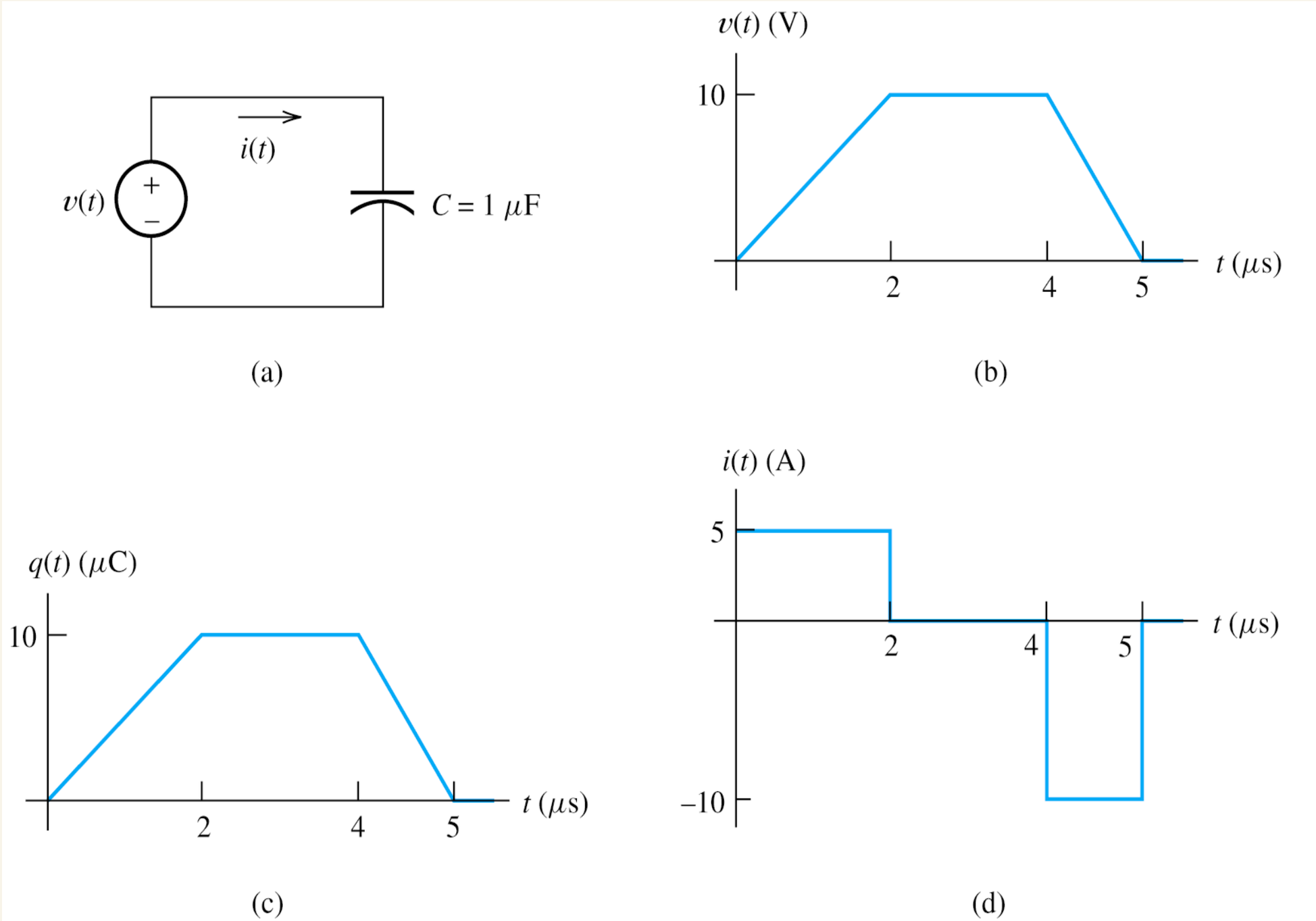
Farad = Coulomb/Volt



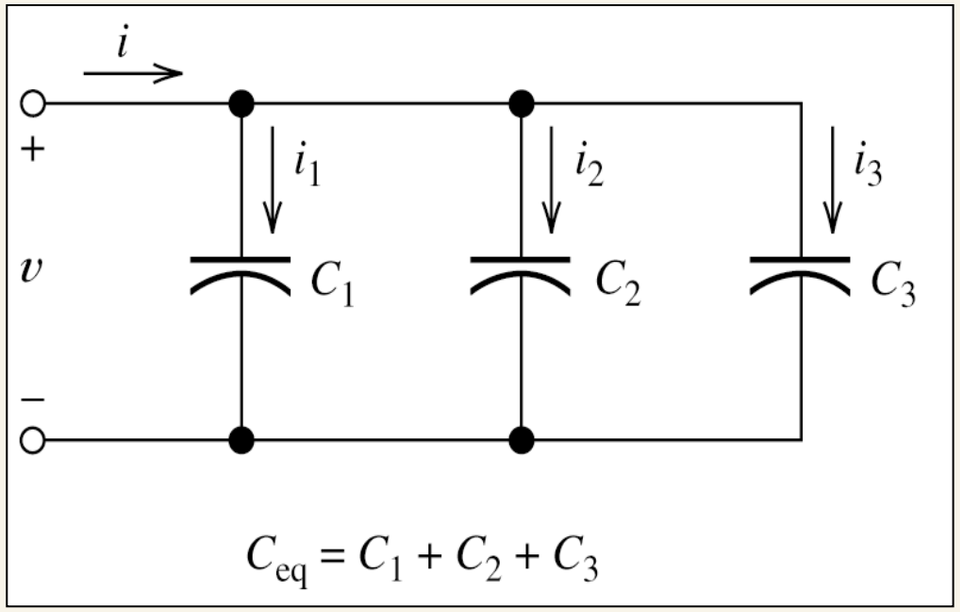
(a) As current flows through a capacitor, charges of opposite sign collect on the respective plates

(b) Fluid-flow analogy for capacitance

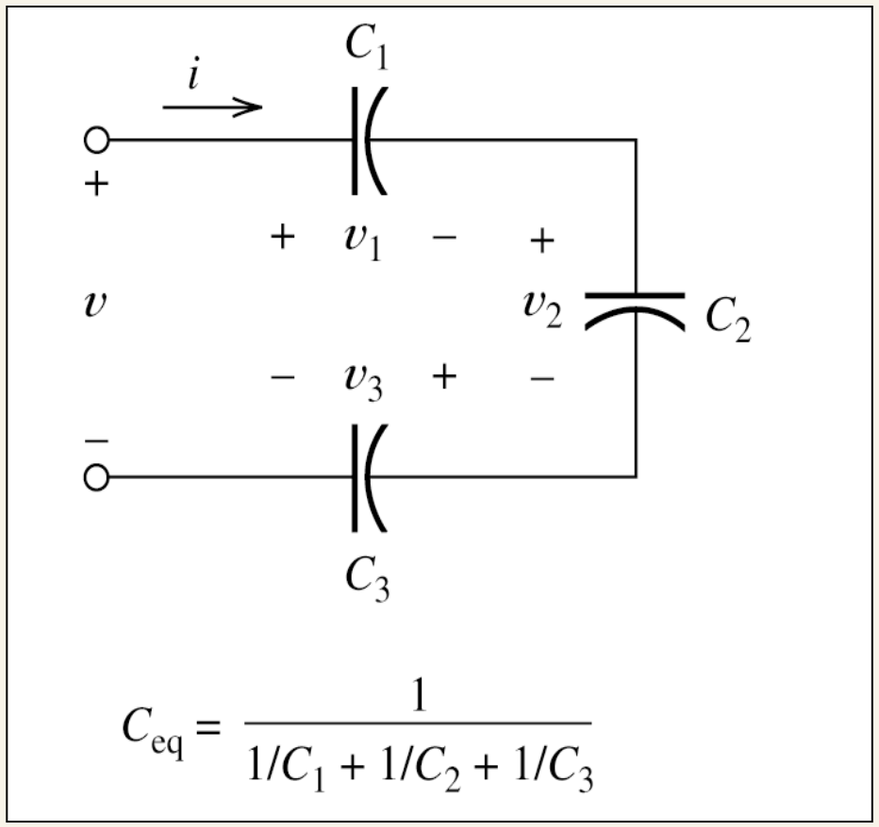
- Exemple



Capacités en série et en parallèle

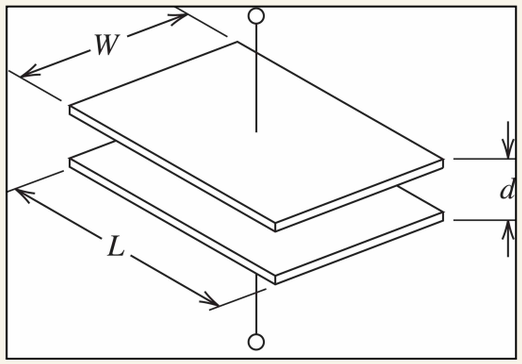


$$C_{eq} = C_1 + C_2 + C_3$$



$$C_{eq} = \frac{1}{1/C_1 + 1/C_2 + 1/C_3}$$

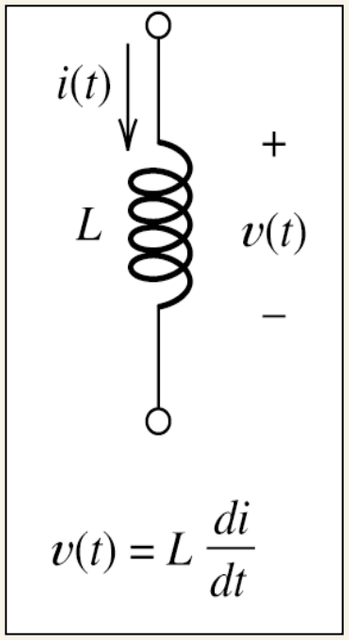
Caractéristiques physiques d'une capacité



$$C = \frac{\epsilon A}{d}$$

$$\epsilon_0 \cong 8.85 \times 10^{-12} F/M$$

Inductance

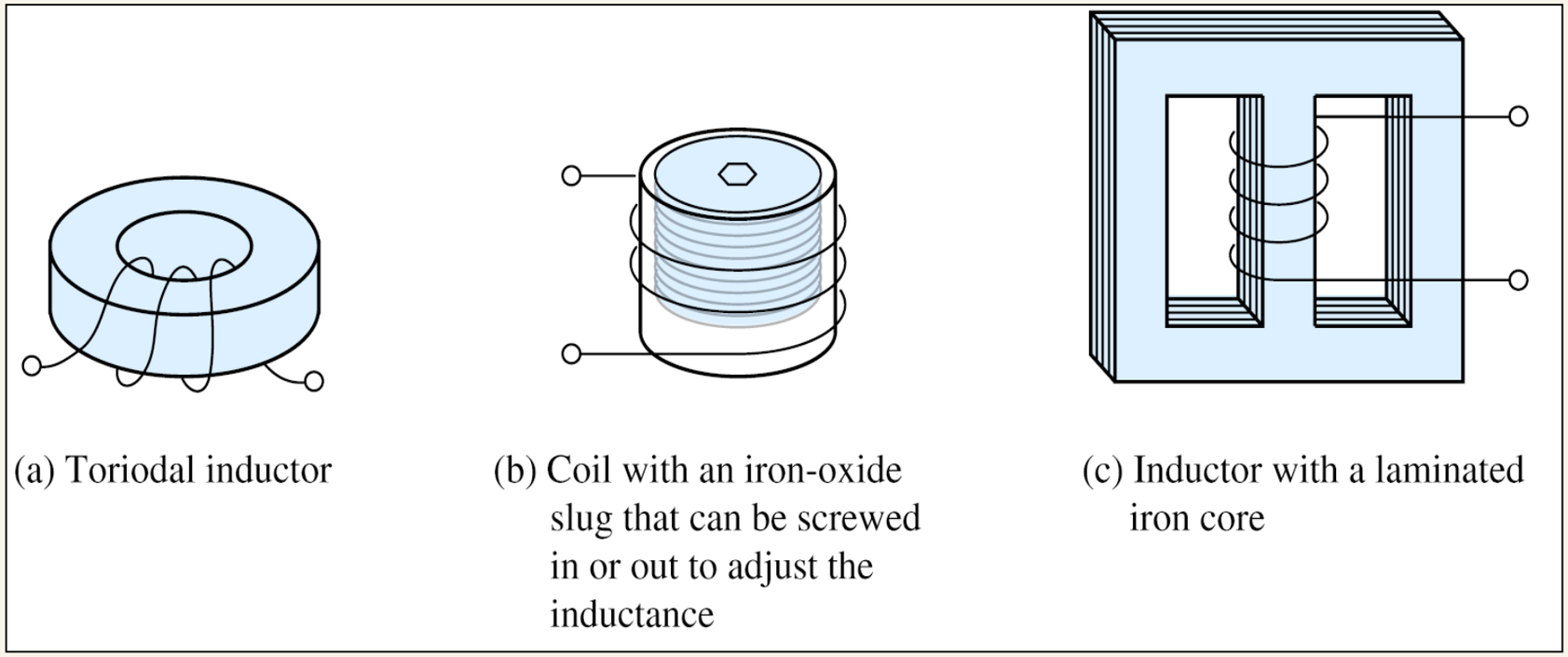


$$v(t) = L\frac{di}{dt}$$

$$i(t) = \frac{1}{L}\int_{t_0}^{t} v(t)dt + i(t_0)$$

$$w(t) = \frac{1}{2}Li^2(t)$$

Henry = Volt . Sec / A

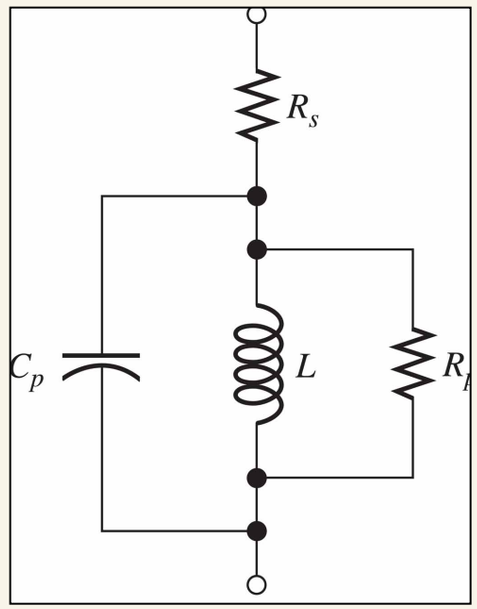


(a) Toriodal inductor

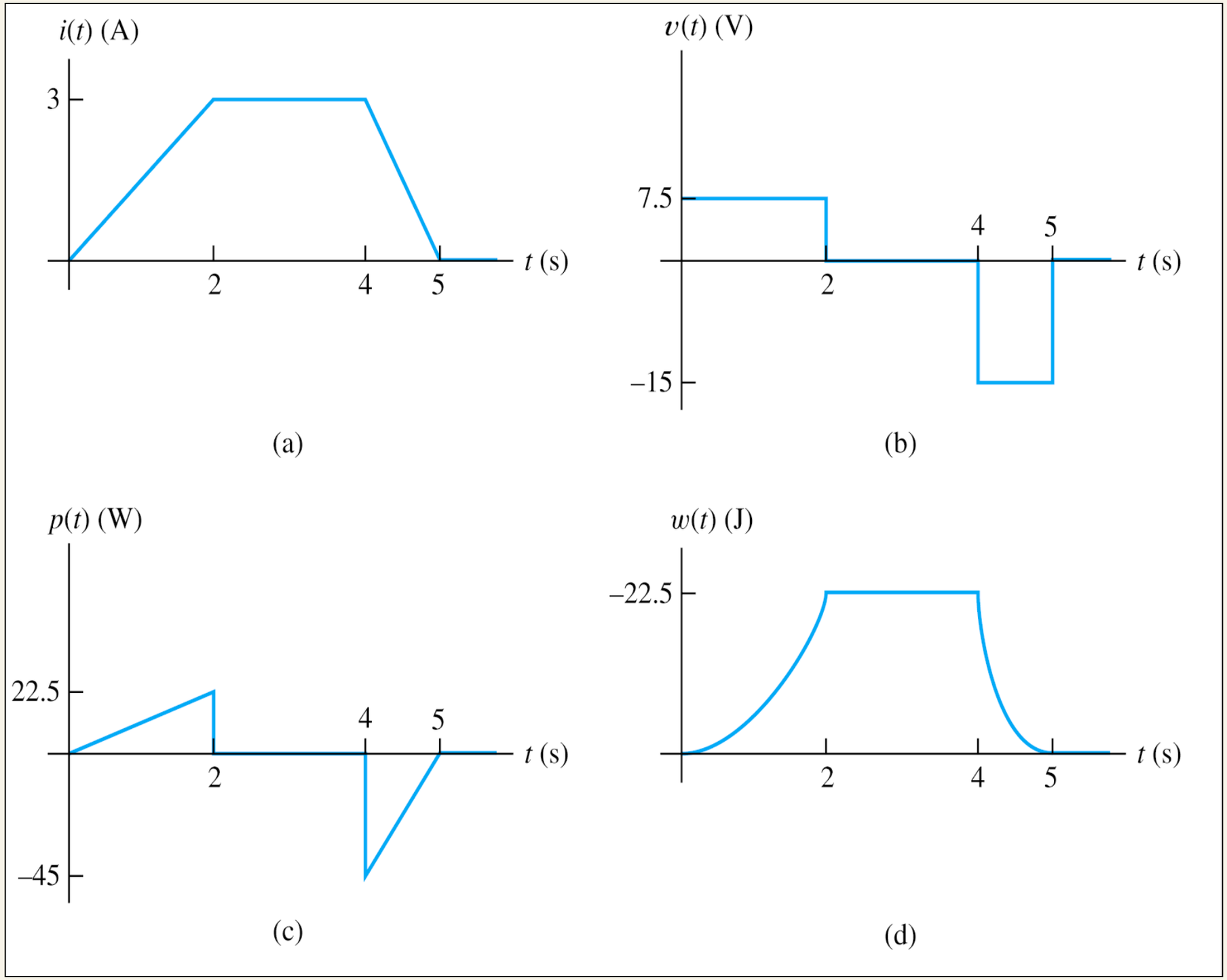
(b) Coil with an iron-oxide slug that can be screwed in or out to adjust the inductance

(c) Inductor with a laminated iron core

Inductance physique



- Exemple



Inductances en série et en parallèle