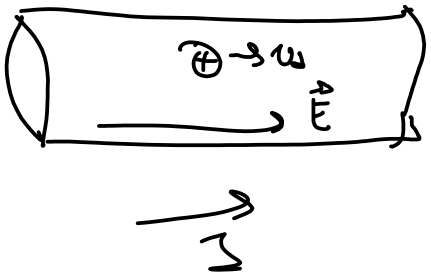
TALLER 6

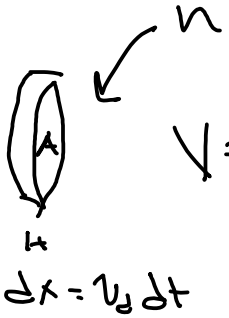
Corriente

Conductores Idealizados

$\Delta x = v_d \Delta t$

↳ Velocidad de arrastre.





$V = A v_d dt$

$\#_p = n V = n A v_d dt$

$dQ = q n A v_d dt$

$I = \frac{dQ}{dt} = q n A v_d$

Corriente

$[C/s] = [A]$

Densidad de corriente

$$\vec{J} = \frac{I}{A} = nq\vec{v}_d$$

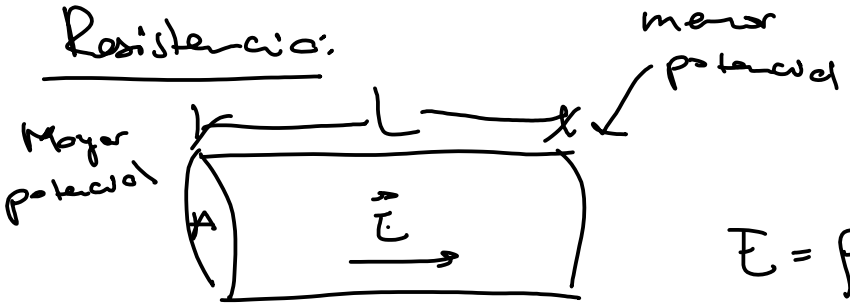
↳ Ec. Continuidad $\nabla \cdot \vec{J} + \frac{\partial \rho}{\partial t} = 0$

$$E \propto J \rightarrow \boxed{\rho J = E}$$ 'Ley' de Ohm

$\rho \rightarrow$ resistividad $[\Omega \cdot m]$

$\frac{1}{\rho} = \sigma =$ conductividad ↓ Ohm

Resistencia:



$$E = \rho J$$

$$\frac{V_{ab}}{L} = \rho \frac{I}{A}$$

$$V = \boxed{\rho \frac{L}{A}} I$$

↳ R Resistencia

$$\boxed{R = \rho \frac{L}{A}}$$

$$[R] = [\Omega]$$

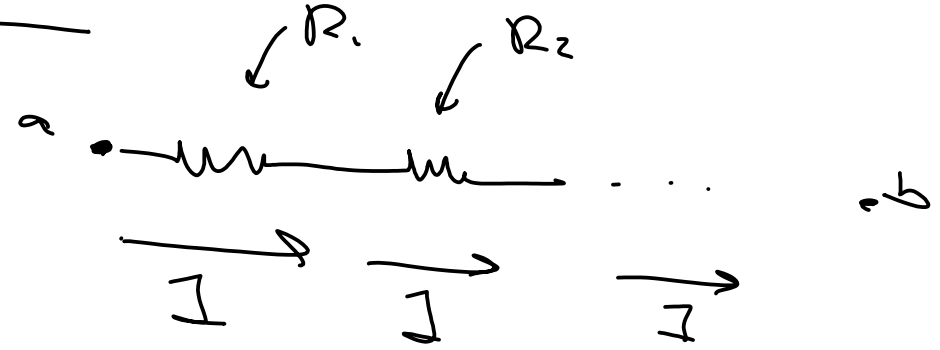
Ohmios.

$$\boxed{V = RI}$$

Corriente Directa (DC)

Arreglos:

Serie

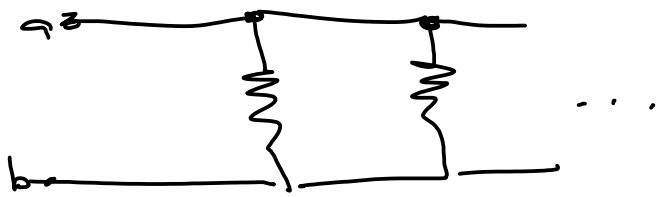


$$V_T = V_a + V_b + \cdots$$

$$R_{eq} I = R_1 I + R_2 I + \cdots$$

$$\therefore R_{eq} = \sum R_i$$

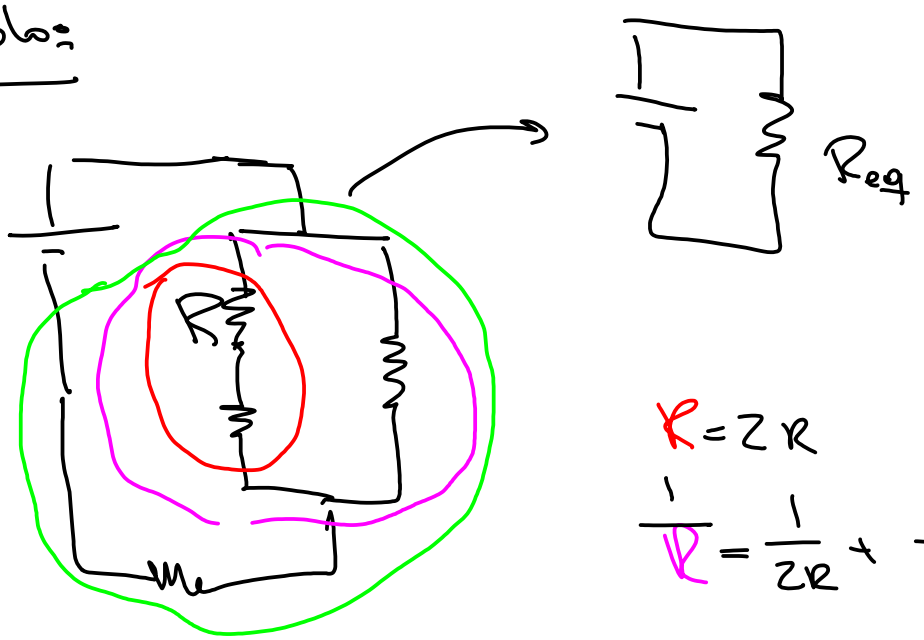
Paralelo



$$I_T = I_1 + I_2 + \cdots$$

$$\frac{V_T}{R_{eq}} = \frac{V_a}{R_1} + \frac{V_b}{R_2} + \cdots \qquad \therefore \frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots$$

Ejemplo:

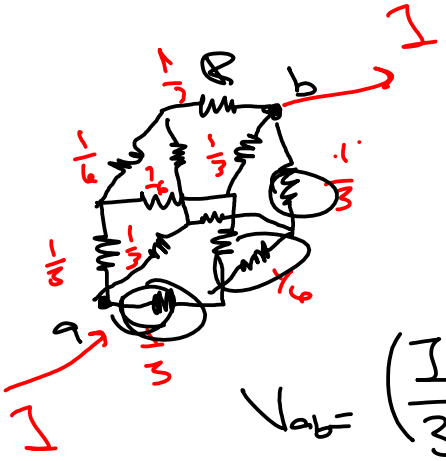


$R = 2R$

$\frac{1}{R} = \frac{1}{2R} + \frac{1}{R} = \frac{3}{2R}$

$R = \frac{2R}{3}$

$$\boxed{R = \frac{5}{3}R}$$



$$V_{ab} = \left(\frac{I}{3}\right)R + \left(\frac{I}{3}\right)R + \left(\frac{I}{6}\right)R = \frac{5}{6}IR$$

$$V_{ab} = I\left(\frac{5}{6}R\right)$$

$\underbrace{\qquad}_{R_{eq}}$

Leyes de Kirchhoff

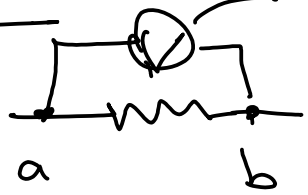
$\sum I = 0$ en los nodos

$\sum V = 0$ en las Mallas

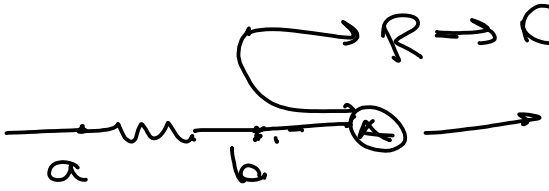
Nodo: Vértices. → Conservación de carga

Malla: Regiones → Conservación de energía

Voltímetros: $R \to \infty$



Amperímetros: $R \to 0$



Corto circuito