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UNIVERSIDAD DE LOS ANDES
MÉRIDA VENEZUELA

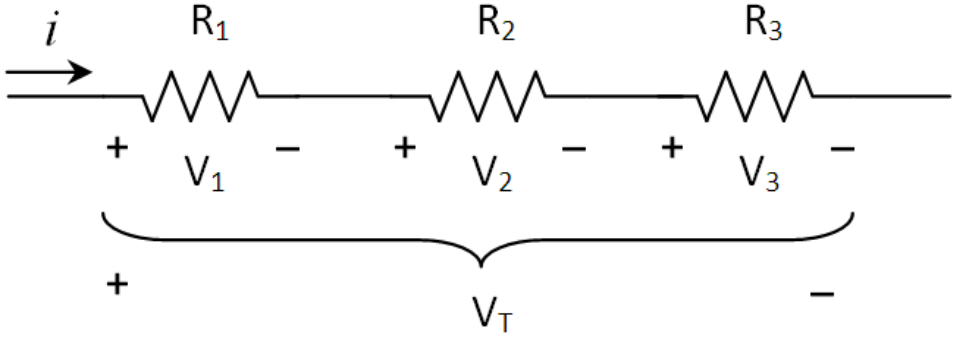
INGENIERIA ELECTRICA
ULA

Elementos (R, L y C) en serie

Prof. Gerardo Ceballos

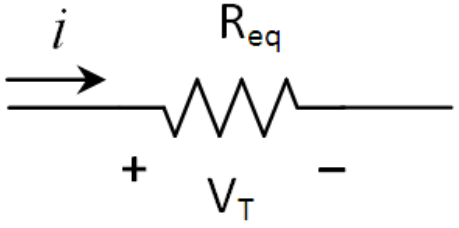
Resistencias en serie

- Los elementos en serie son atravesados por la misma corriente



$$V_T = V_1 + V_2 + V_3$$

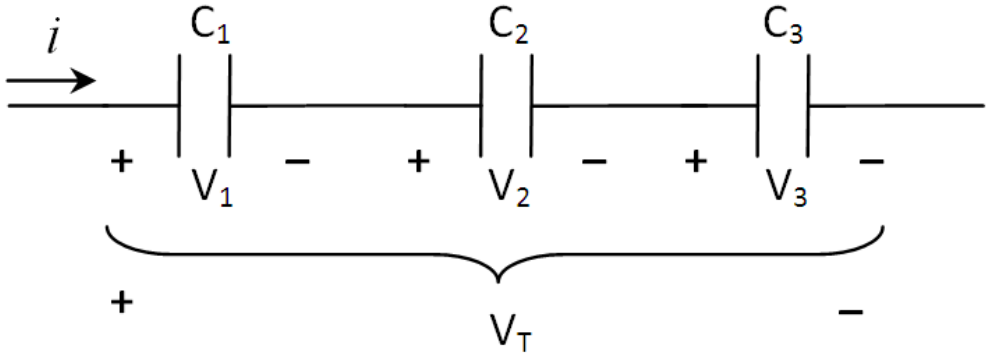
$$V_T = iR_1 + iR_2 + iR_3 = i\left(R_1 + R_2 + R_3\right) = iR_{eq}$$



$$R_{eq} = R_1 + R_2 + R_3$$

$$\frac{1}{G_{eq}} = \frac{1}{G_1} + \frac{1}{G_2} + \frac{1}{G_3}$$

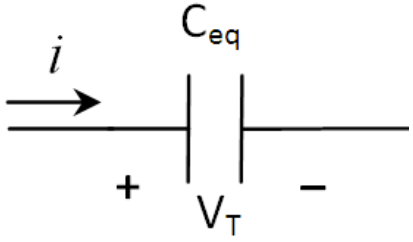
Capacitores en serie



$$V_T = V_1 + V_2 + V_3$$

$$V_T = \frac{1}{C_1}\int idt + \frac{1}{C2}\int idt + \frac{1}{C3}\int idt =$$

$$\left(\frac{1}{C_1} + \frac{1}{C2} + \frac{1}{C3}\right)\int idt = \frac{1}{Ceq}\int idt$$

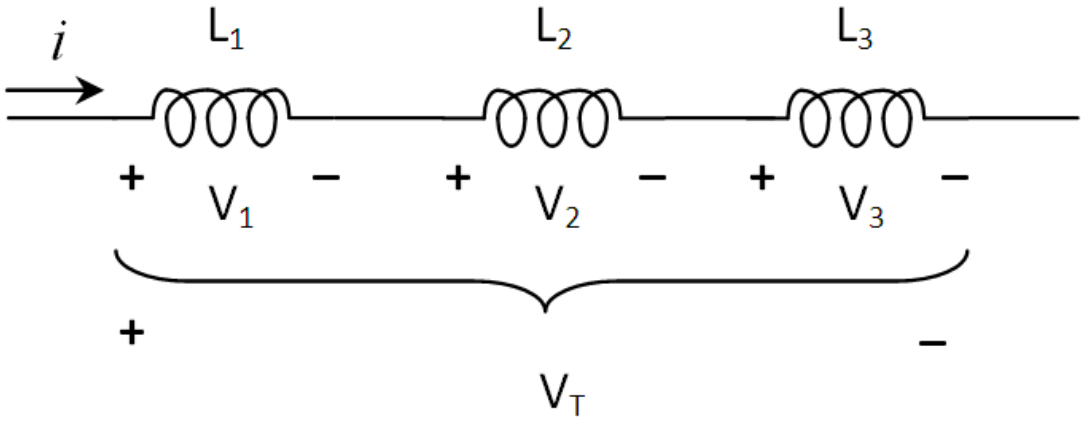


$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$$

Si son dos capacitores en serie:

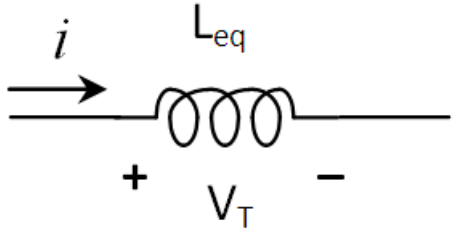
$$C_{eq} = \frac{C_1 C_2}{C_1 + C_2}$$

Inductores en serie



$$V_T = V_1 + V_2 + V_3$$

$$V_T = L_1 \frac{di}{dt} + L_2 \frac{di}{dt} + L_3 \frac{di}{dt} = (L_1 + L_2 + L_3)\frac{di}{dt} = L_{eq} \frac{di}{dt}$$



$$L_{eq} = L_1 + L_2 + L_3$$

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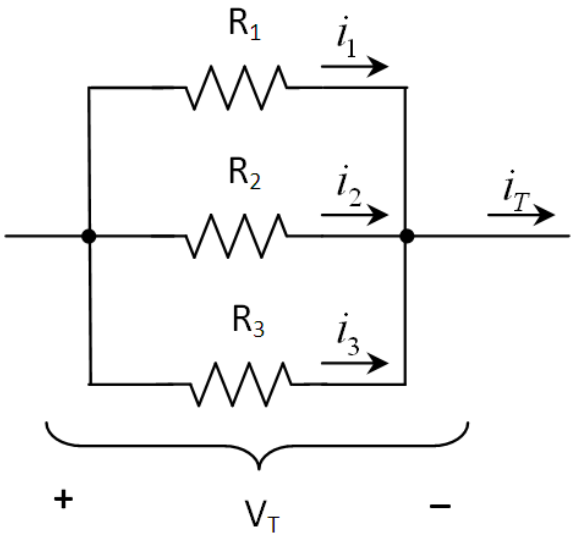
Elementos (R, L y C) en paralelo

Prof. Gerardo Ceballos

Resistencias en paralelo

- Sus extremos están conectados a los mismos nodos. Sometidos al mismo voltaje.



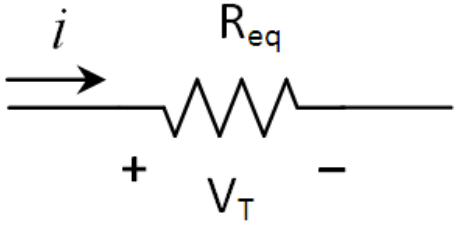
$$i_T = i_1 + i_2 + i_3$$

$$i_T = vG_1 + vG_2 + vG_3$$

$$= v\left(G_1 + G_2 + G_3\right) = vG_{eq}$$

Si son dos resistores en paralelo:

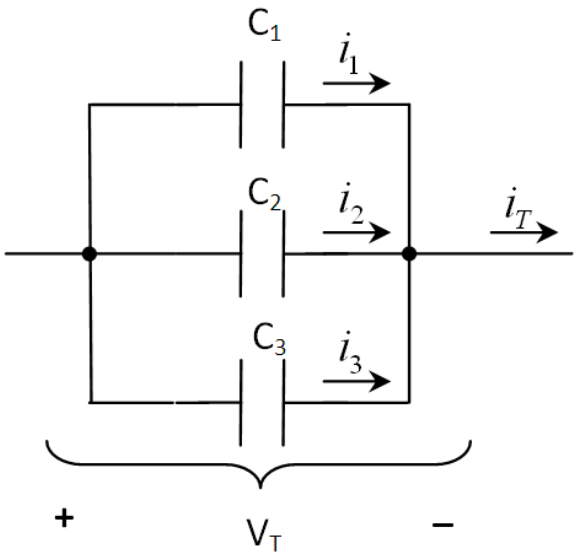
$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2}$$



$$G_{eq} = G_1 + G_2 + G_3$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

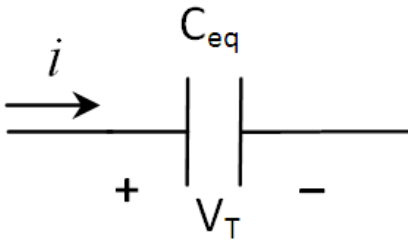
Capacitores en paralelo



$$i_T = i_1 + i_2 + i_3$$

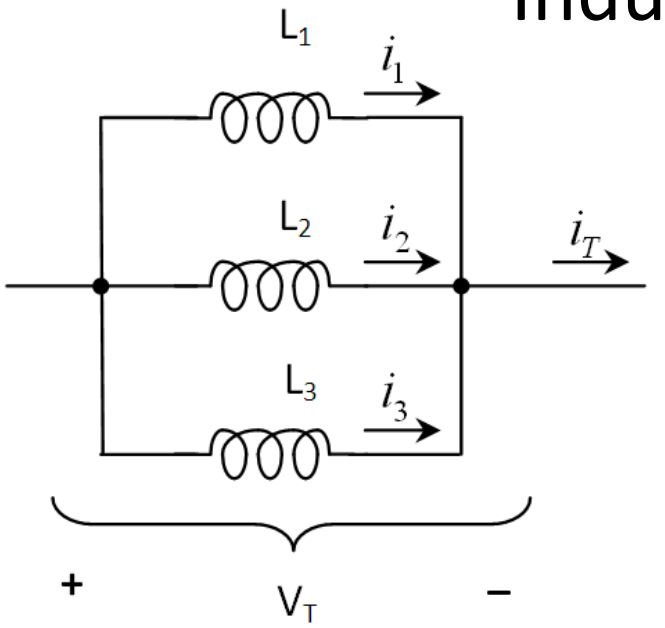
$$i_T = C_1 \frac{dv}{dt} + C_2 \frac{dv}{dt} + C_3 \frac{dv}{dt}$$

$$= (C_1 + C_2 + C_3)\frac{dv}{dt} = C_{eq} \frac{dv}{dt}$$



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

Inductores en paralelo



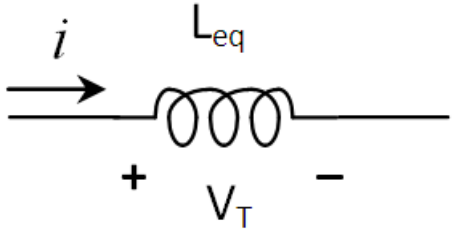
$$i_T = i_1 + i_2 + i_3$$

Si son dos inductores en paralelo:

$$L_{eq} = \frac{L_1 L_2}{L_1 + L_2}$$

$$i_T = \frac{1}{L_1}\int v\,dt + \frac{1}{L2}\int v\,dt + \frac{1}{L3}\int v\,dt =$$

$$\left(\frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}\right)\int v\,dt = \frac{1}{L_{eq}}\int v\,dt$$



$$\frac{1}{L_{eq}} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}$$

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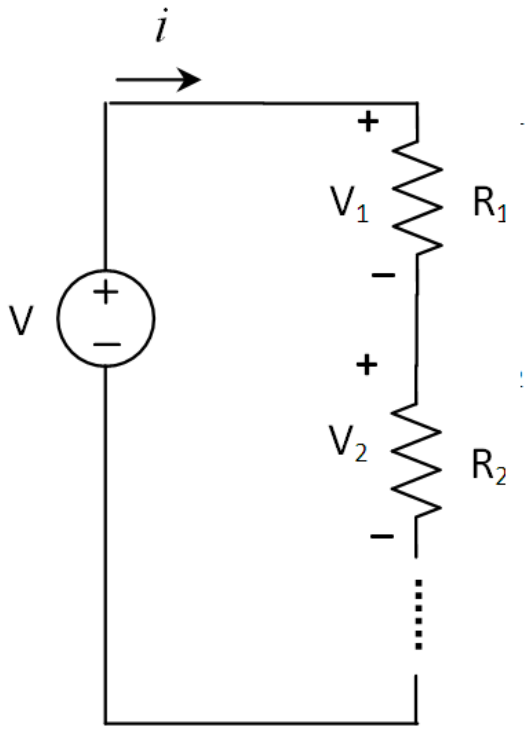
Divisor de Voltaje
y
Divisor de Corriente

Prof. Gerardo Ceballos

Divisor de Voltaje



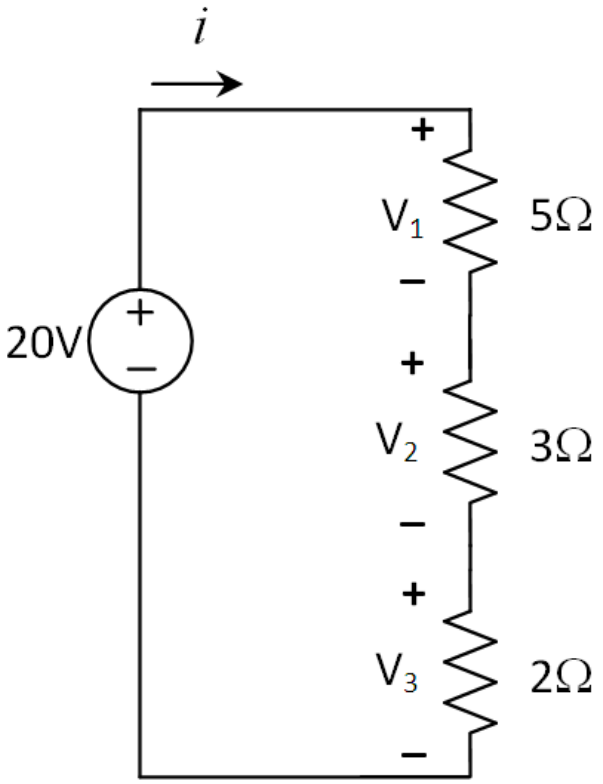
$$i = \frac{v}{R_1 + R_2 + \ldots}$$

$$v_1 = v\frac{R_1}{R_1 + R_2 + \ldots}$$

$$v_2 = v\frac{R_2}{R_1 + R_2 + \ldots}$$

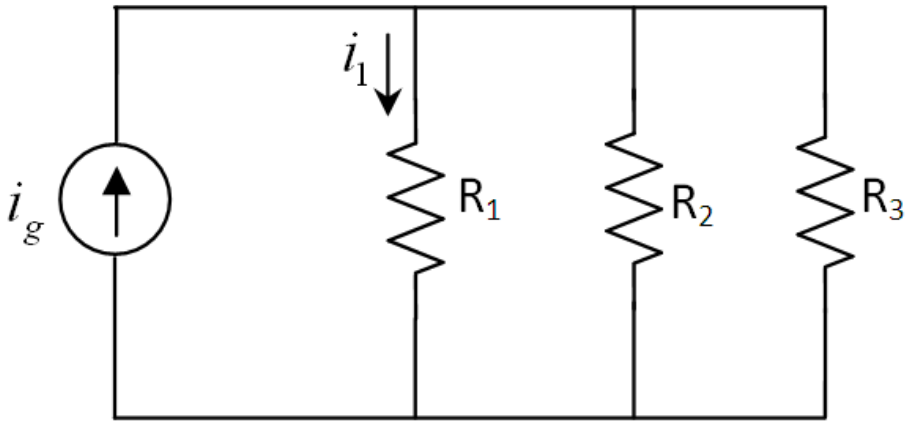
Divisor de Voltaje

- Ejemplo: Hallar V_1



Proporcionalidad

Divisor de Corriente



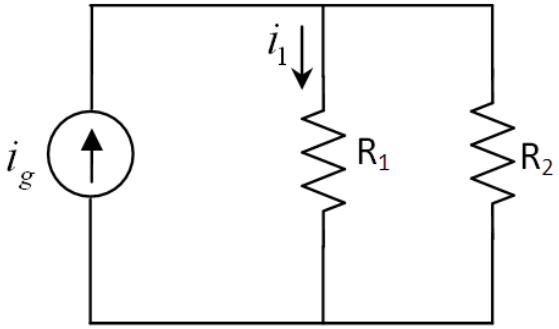
$$v = \frac{i_g}{G_{eq}} = \frac{i_g}{G_1 + G_2 + \ldots}$$

$$i_1 = \frac{v}{R_1} = vG_1$$

$$i_1 = i_g \frac{G_1}{G_1 + G_2 + \ldots}$$

Para dos resistencias en paralelo:

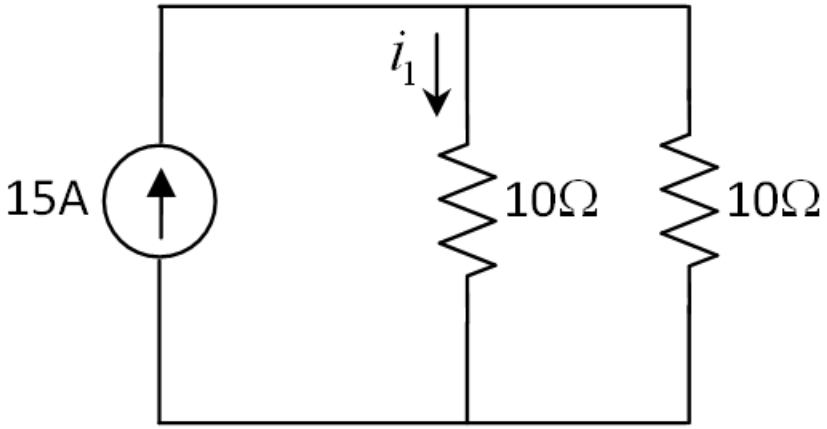
Resistencia por donde no pasa

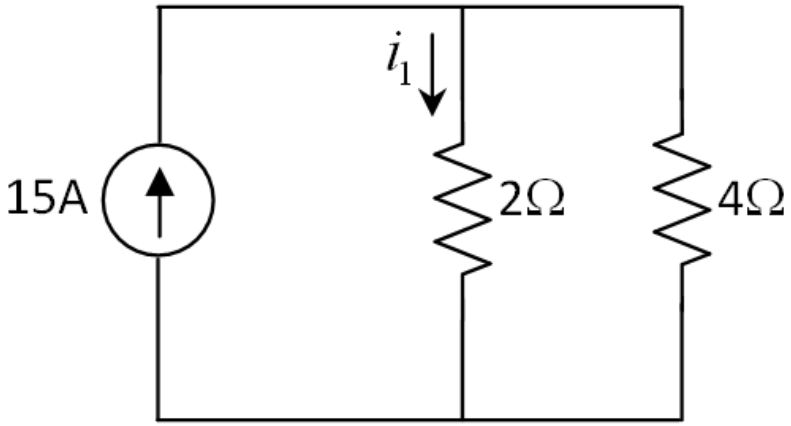


$$i_1 = i_g \frac{\frac{1}{R_1}}{\frac{1}{R_1} + \frac{1}{R_2}} = \frac{\frac{1}{R_1}}{\frac{R_1 + R_2}{R_1 R_2}} = \frac{R_2}{R_1 + R_2}$$

Divisor de Corriente

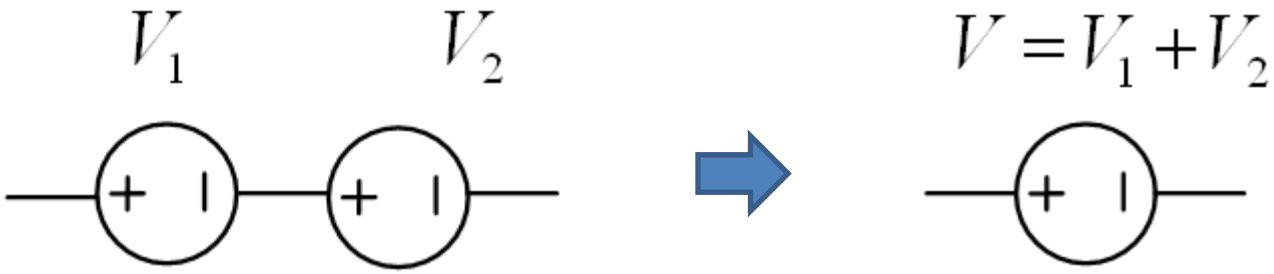
- Ejemplo: Hallar i_1

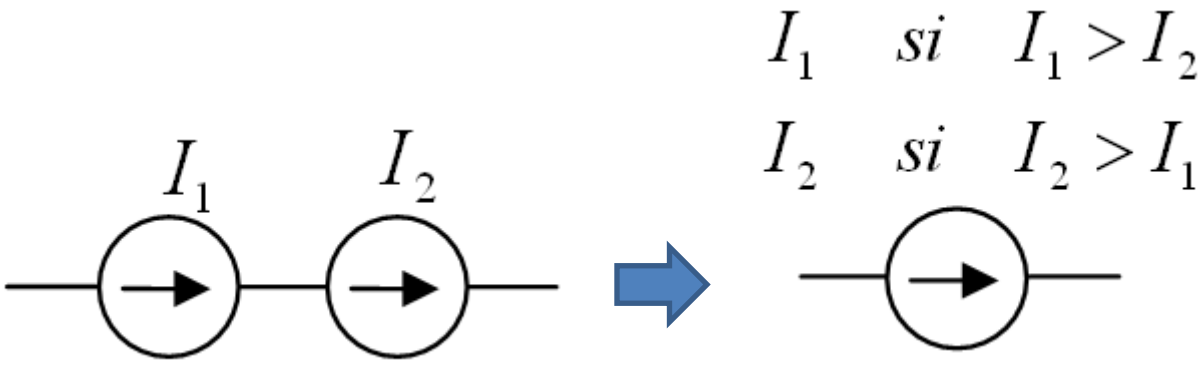




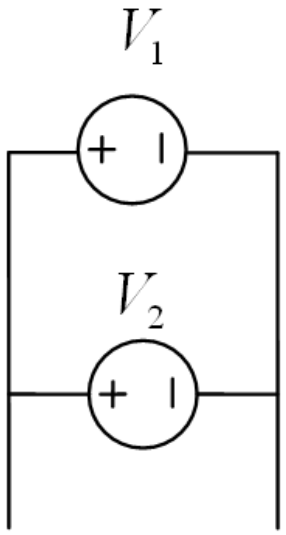
Mayor resistencia menor corriente

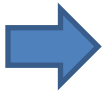
Fuentes en serie





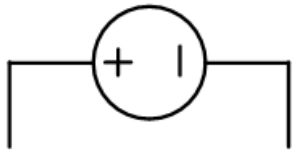
Fuentes en paralelo

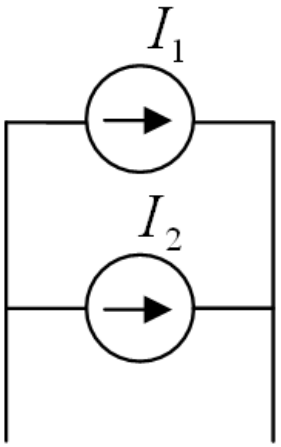


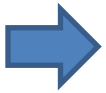


$V_1 \quad si \quad V_1 > V_2$

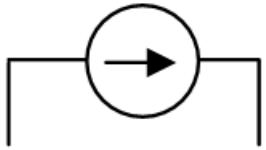
$V_2 \quad si \quad V_2 > V_1$





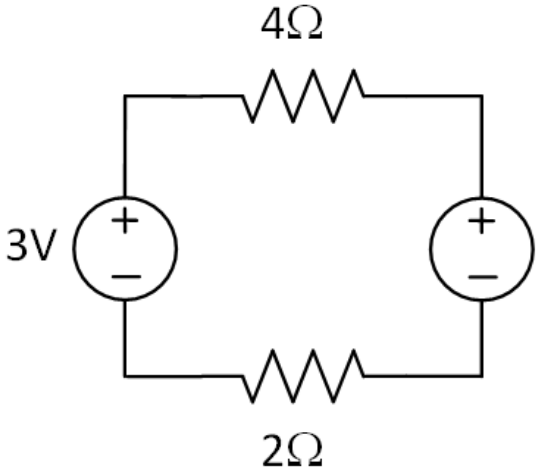


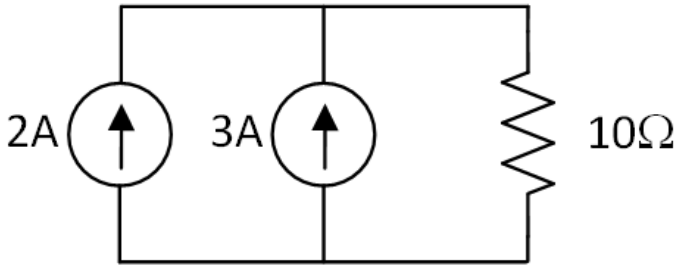
$I = I_1 + I_2$

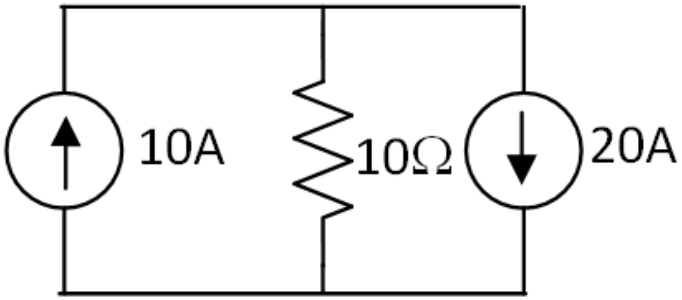


Fuentes en serie y paralelo

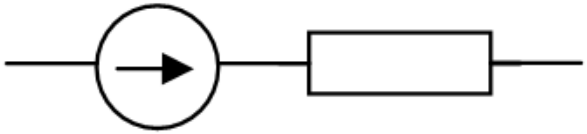
- Ejemplo:

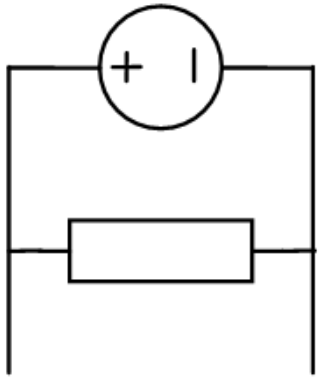






Rama independiente





Ejemplo: