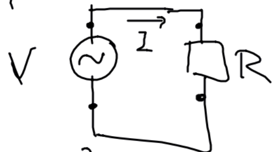
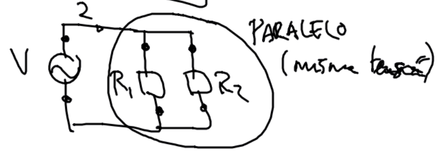
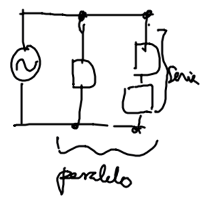
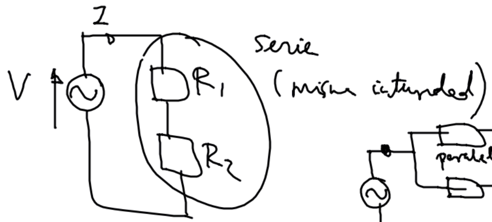
Ley OHM → $V(\text{volt}) = I(A) \cdot R(\Omega)$

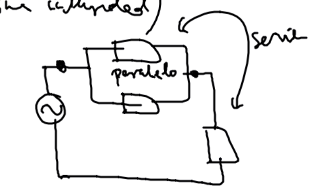
- V: tensión / voltage
- I: intensidad corriente
- R: Resistencia

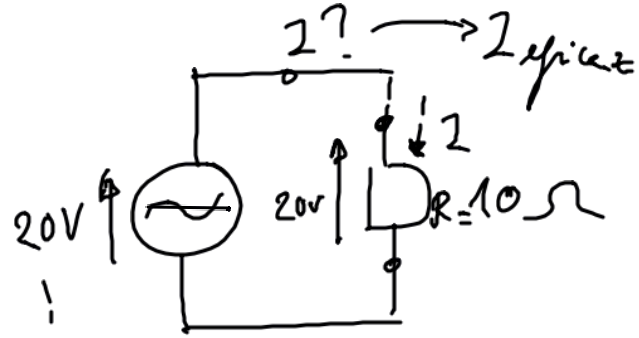










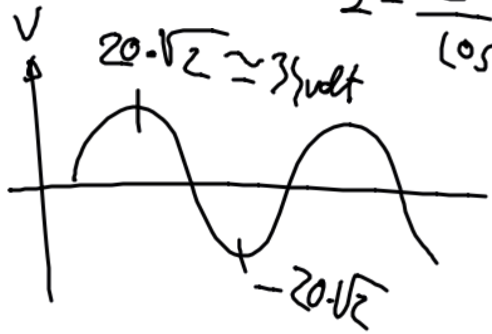


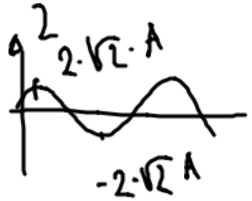
→ V eficaces

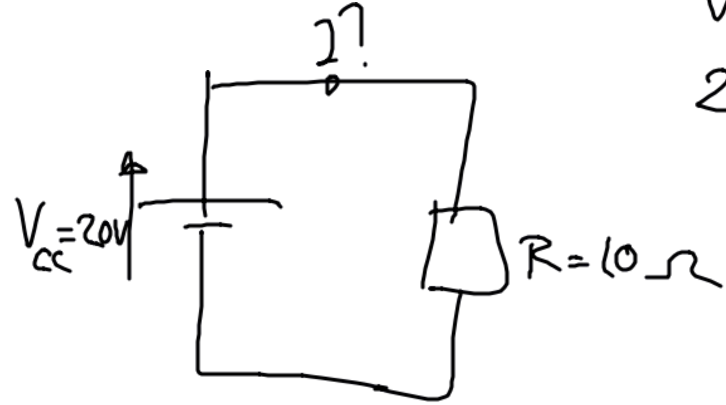
$$V = I \cdot R$$

$$20\,\text{volt} = I \cdot 10\,\Omega$$

$$I = \frac{20V}{10\,\Omega} = 2A$$







$$V = I \cdot R$$

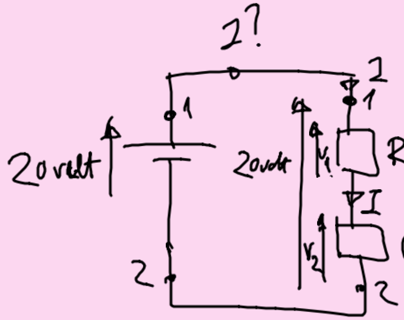
$$20\,V_{cc} = I_{cc} \cdot 10\,\Omega$$

$$I_{cc} = \frac{20\,\text{volt}}{10\,\Omega} = 2A$$

V_{cc} → tensió en contínua

I_{cc} → intensitat ..

KIRCHOFF



$R_1 = 10\,\Omega$ $\quad V_1 = I \cdot R_1$

$R_2 = 20\,\Omega$ $\quad V_2 = I \cdot R_2$

$$V_g - V_1 - V_2 = 0$$

$$V_g = V_1 + V_2 \longrightarrow 20\,\text{volt} = I \cdot R_1 + I \cdot R_2 = I\,(R_1 + R_2)$$

(10Ω, 20Ω)

$$I = \frac{20\,\text{volt}}{(10+20)\,\Omega} = \frac{20\,\text{volt}}{30\,\Omega} = \boxed{0'66\,A}$$

$$V_1 = I \cdot R_1 = 0'66A \cdot 10\,\Omega = 6'6\,\text{volt}$$

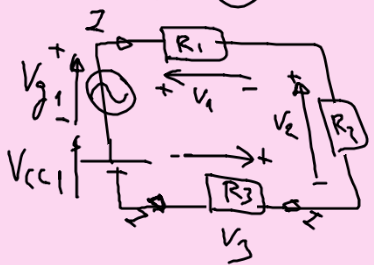
V_2? $\rightarrow$ $V_2 = I \cdot R_2 = 0'66 \cdot 20 = 13'2$ volt

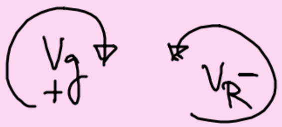
$\rightarrow$ $V_g = V_1 + V_2$

$$V_2 = V_g - V_1 = 20 - 6'6 = 13'2\,\text{volt}$$

1ª ley Kirchoff

Suma de todas las tensiones en una malla es 0 . generadores elementos

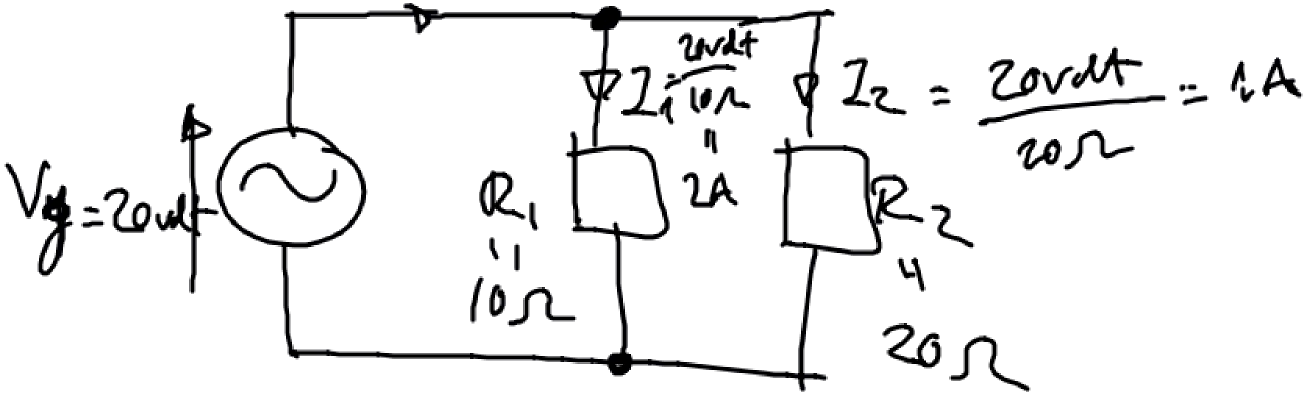




$$V_g + V_{cc1} - V_1 - V_2 - V_3 = 0$$

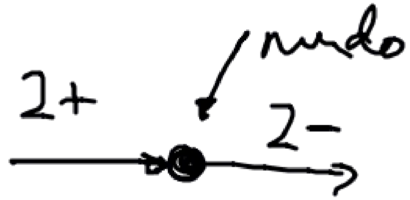
Circuito paralelo

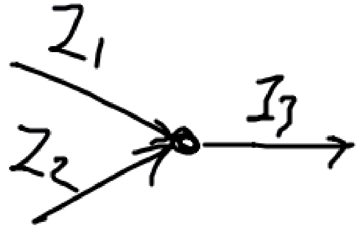
$I = I_1 + I_2 = 2A + 1A = 3A$ I, I_1, I_2 ?



2ª ley Kirchoff

Suma de intensidades (con su signo) en un nudo es 0

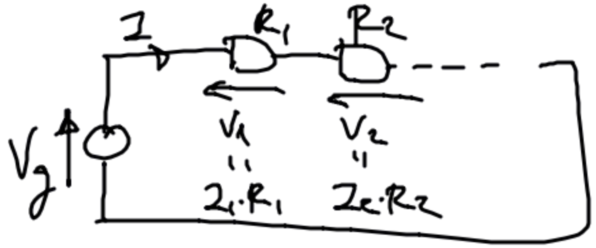




$$I_1 + I_2 - I_3 = 0$$

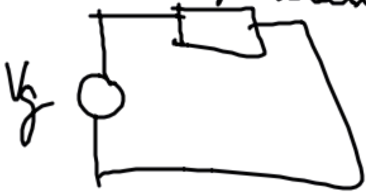
$$I_1 + I_2 = I_3$$

Resistencia Serie



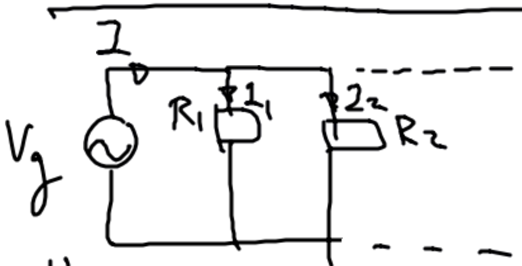
$$V_g = V_1 + V_2 = I R_1 + I \cdot R_2 =$$
$$= I (R_1 + R_2)$$

$$R_{equivalente} = R_1 + R_2 + \ldots$$



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

Resistencia PARALELO

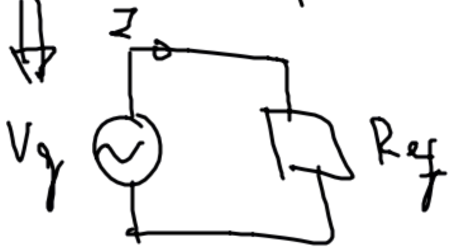


$$I_1 = \frac{V_g}{R_1} \qquad I_2 = \frac{V_g}{R_2}$$

$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{20} = \frac{2+1}{20} = \frac{3}{20}$$

$$I = I_1 + I_2 = \frac{V_g}{R_1} + \frac{V_g}{R_2} = V_g \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$$

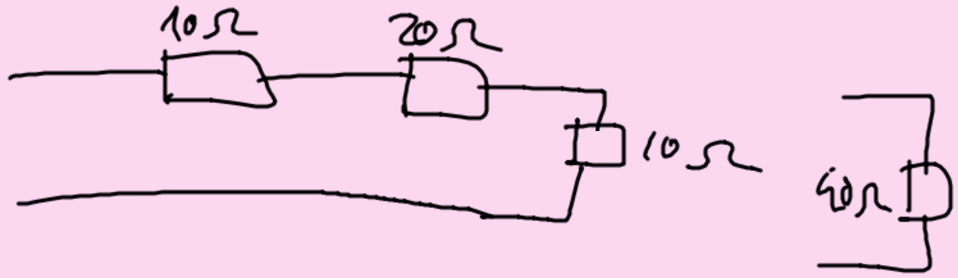
⇓



$$I = \frac{V_g}{R_{eq}} = V_g \cdot \frac{1}{R_{eq}}$$

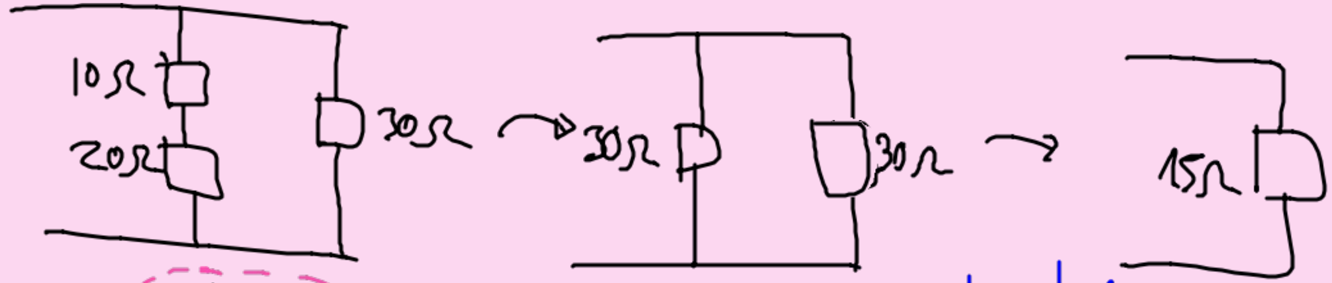
$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \ldots \Rightarrow R_{eq} = \frac{R_1 \cdot R_2 \cdot \ldots}{R_1 + R_2 + \ldots}$$

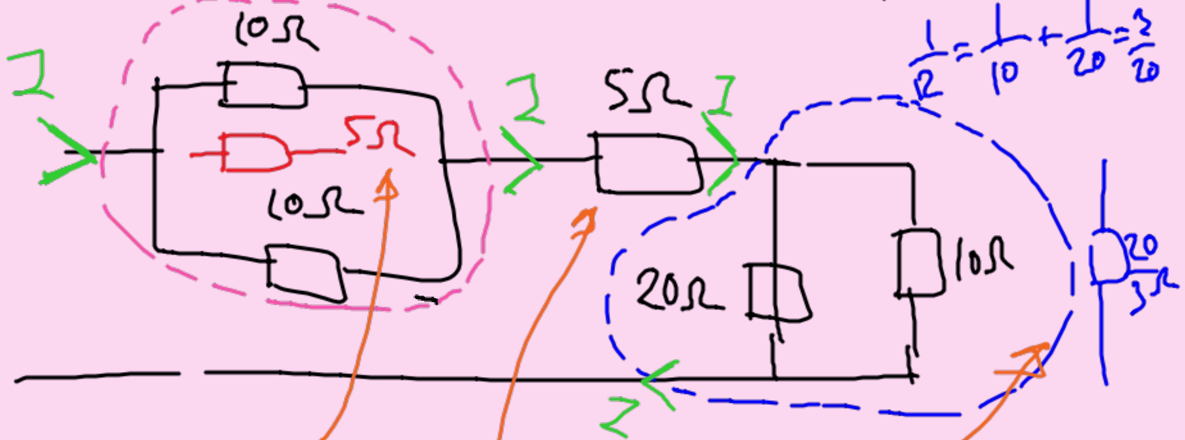
Req?

① 

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{30} + \frac{1}{30} = \frac{1+1}{30} = \frac{2}{30} = \frac{1}{15}$$

$$R_{eq} = \frac{15}{1} = 15\,\Omega$$

② 

③ 

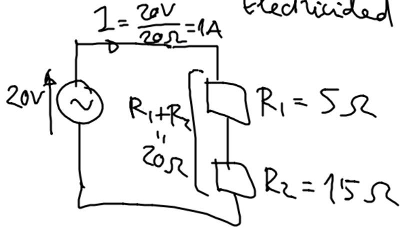
$$\frac{1}{R} = \frac{1}{10} + \frac{1}{20} = \frac{3}{20}$$

$$R_{eq} = 5\,\Omega + 5\,\Omega + 6'66\,\Omega = 16'66\,\Omega$$

Potencia ⇒ Capacidad de "mover" algo en un tiempo definido

$$P = \frac{W}{t} = V \cdot I \rightarrow 1\,watt = 1\,volt \cdot 1A$$

Electricidad



$P_{generador}$? $P_g = V_g \cdot I = 20V \cdot 1A = 20\,watt$ (generados)

P_{R1} (consumida)? $P_{R1} = V_{R_1} \cdot I = 5volt \cdot 1A = 5\,watt$ (consumidos), con $V_{R_1} = I \cdot R_1 = 1A \cdot 5\Omega = 5volt$, $I = 1A$

P_{R2} (consumida)? $P_{R2} = V_{R_2} \cdot I = 15volt \cdot 1A = 15\,watt$ (consumidos)

$$P = V \cdot I = \underbrace{I \cdot R}_{V} \cdot I = I^2 \cdot R = V \cdot \underbrace{\frac{V}{R}}_{I} = \frac{V^2}{R}$$

$$V = I \cdot R \rightarrow I = \frac{V}{R}$$

Potencia = Trabajo realizado / Energía consumida } en un tiempo determinado

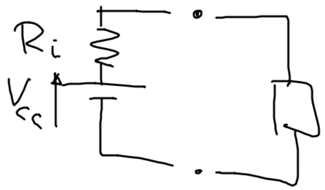
$$P = \frac{W}{t}$$

W ← Energía (kwh, Joule ....)

t ← tiempo (h, s, min ...)

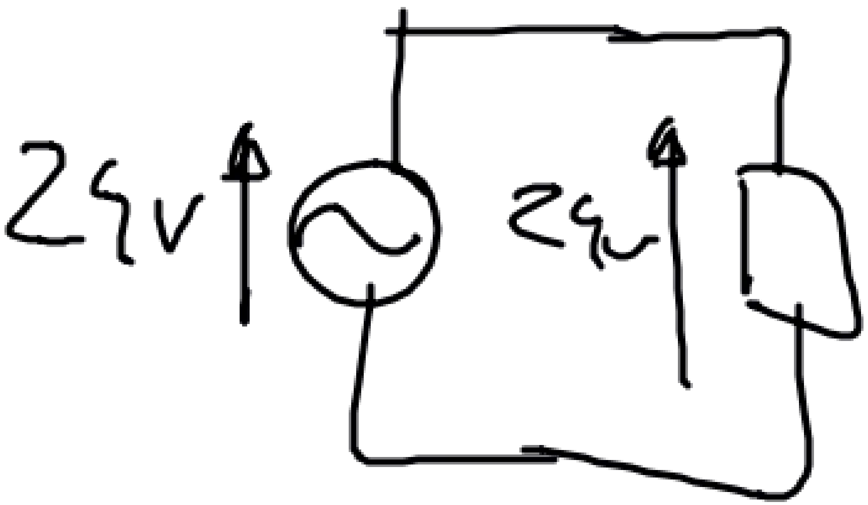
P ← Potencia (watt, CV...)

$$Energía = W = P \cdot t \rightarrow 1\,Kwh = 1\,Kw \cdot 1h$$



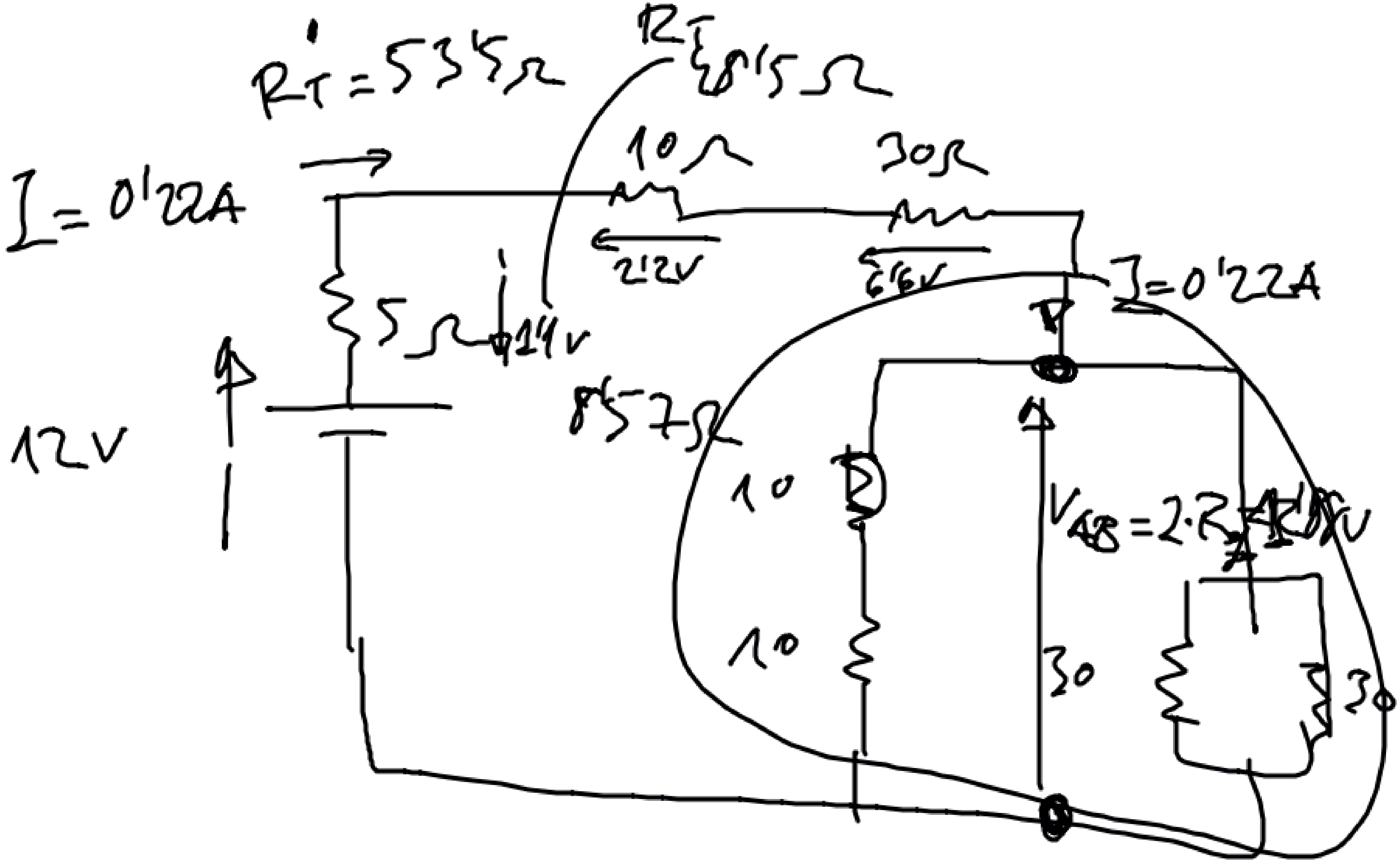
$P_{camnide} \doteq 1$ kwatt

$V_g = 24$ volt



1kw → $P = V \cdot I$ → I

V, I → R



R'T = 53'5 Ω
RT = 8'5 Ω
I = 0'22A
10 Ω
30Ω
2'2V
6'6V
5 Ω
1'1V
I = 0'22A
12V
8'57Ω
10
10
30
30

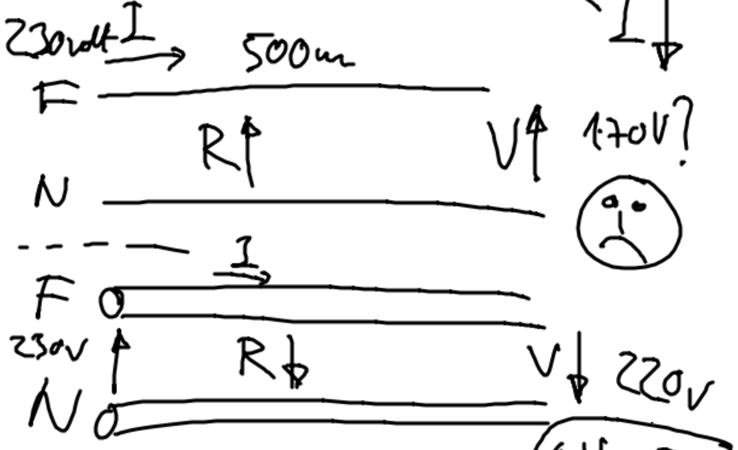
Transformador — V↑, I↓

$P = V \cdot I$ (230 volt)

S sección (mm^2)

Fuerza I↑

Iluminación / Alumbrado I↓



ley de OHM

$V = I \cdot R$

$\Delta V < 5\%$ FUERZA

$\Delta V < 3\%$ ALUMBRADO

P↓ I↓

Sección del cable?

$$R_{cable}(\Omega) = \rho \frac{l}{S}$$

l: longitud del cable conductor (m)

S: sección del cable (mm^2)

ρ: resistividad del material ($\Omega \cdot \frac{mm^2}{m}$)

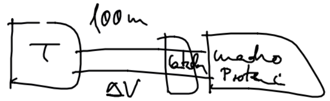
longitud ↑ R ↑ — tamaño

grosor ↑ R ↓

material — barato, conductor, ligero

Acometida de 100 m a una instalacion de

$P_{max} = 1000$ watt, Cu/Al



$\rho_{Cu} = 1'70 \cdot 10^{-8}\ \Omega \cdot m \quad \left(\Omega \cdot \frac{mm^2}{m}\right)$?

$\rho_{Al} = 2'82 \cdot 10^{-8}\ \Omega \cdot m$

$l = 100$ m

$P_{max} = 1000$ watt

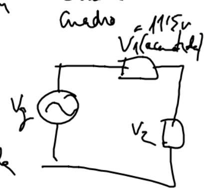
$\Delta V < 5\% = 11'5$ volt

$V_{Transformador} = 230$ volt $\xrightarrow{100 m}$ $V_{Contador/Cuadro} = 218'5$ volt

1º: I? (P, V) → 2: S? (V, I ⇒ R; ρ, l acometida)

l? 200 m

V? 11'5 V



P = 1000 W, V = 218'5 volt → $I = \frac{P}{V} = 4'57$ A

maxima que va a consumir

I = 4'57 A, $\Delta V_{acometida} = 11'5$ volt (→ 230 volt, 5%) → $V = I \cdot R \rightarrow R = \frac{V}{I} = \frac{11'5 \text{ volt}}{4'57 \text{ A}} =$ **R = 2'51 Ω**

R = 2'51 Ω, l = 100 m (ida) + 100 m (vuelta) = 200 m, ρ_{Cu}, ρ_{Al} → $R = \rho \cdot \frac{l}{S} \rightarrow 2'51\ \Omega = 1'7 \cdot 10^{-8}\ \Omega \cdot m \cdot \frac{200 m}{S}$

$S = \frac{1'7 \cdot 10^{-8} \times 200}{2'51}\ m^2 = 1'4 \cdot 10^{-6}\ m^2$

$1'4 \cdot 10^{-6}\ m^2 \cdot \frac{10^6\ mm^2}{1\ m^2} = 1'4\ mm^2$ →

- 1 mm² →
- 1'5 mm² →
- 2 mm² →
- 2'5 mm² →
- 4 mm² →
- 6 mm² →
- 10

2 max 10 A

$1\,m = 1000\ mm$

$(1\,m)^2 = (1000\,mm)^2 = (10^3)^2 \cdot mm^2 = 10^6\,mm^2$

$3\,\cancel{m^2} \cdot \frac{10^6\,mm^2}{1\,\cancel{m^2}} = 3 \cdot 10^6\,mm^2$ FACTOR CONVERSION

$270.420\,\cancel{mm^2}\ \frac{1\,m^2}{10^6\,\cancel{mm^2}} = \frac{270\,420}{10^6}\,m^2 = 0'27042\,m^2$

1000 m → AZUL (neutro)

→ NEGRO, MARRON, GRIS (Fase)

→ AMARILLO/VERDE (Tierra)