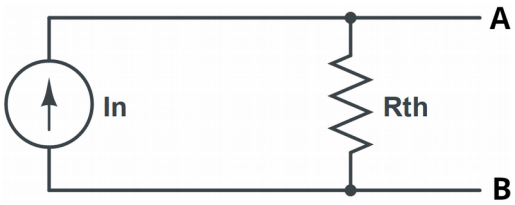
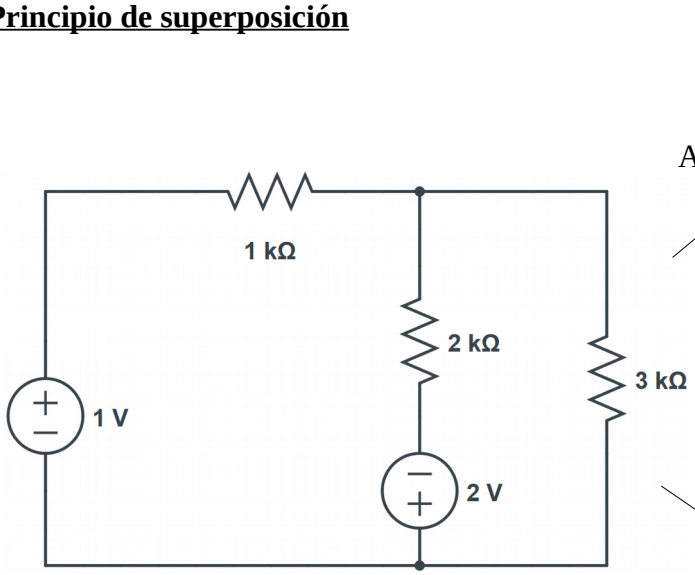
Equivalente Norton

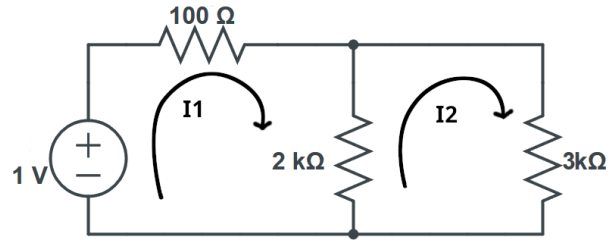


$$I_n = \frac{V_{th}}{R_{th}}$$

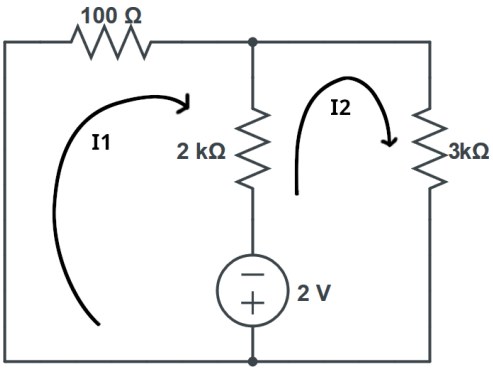
Principio de superposición



A



B



Malla 1

$$1 = 3I_1 - 2I_2 \rightarrow 1 = \frac{15}{2}I_2 - 2I_2 = \frac{11}{2}I_2 \rightarrow I_2 = \frac{2}{11}mA$$

Malla 2

$$0 = -2I_1 + 5I_2 \rightarrow I_1 = \frac{5}{2}I_2 \rightarrow \frac{5}{11}mA = I_1$$

Malla 1

$2=3I'_1-2I'_2 \quad \rightarrow \quad 2=3\left(\frac{5}{2}I'_2+1\right)-2I'_2 \rightarrow 2=\frac{15}{2}I'_2+3-2I'_2=\frac{11}{2}I'_2+3$

Malla 2

$-2=-2I'_1+5I'_2 \quad \rightarrow \quad I'_1=\frac{5I'_2+2}{2}=\frac{5}{2}I'_2+1$

$I'_2=\frac{-2}{11}mA$

$3=3I''_1-2I''_2$

$-2=-2I''_1+5I''_2 \quad \rightarrow \quad I''_1=\frac{5I''_2+2}{2}=\frac{5}{2}I''_2+1$

$3=\frac{15}{2}I''2+3-2I''_2 \rightarrow I''_2=0\,mA$

$I''_1=1mA$

Corriente alterna

V(t)
I(t)

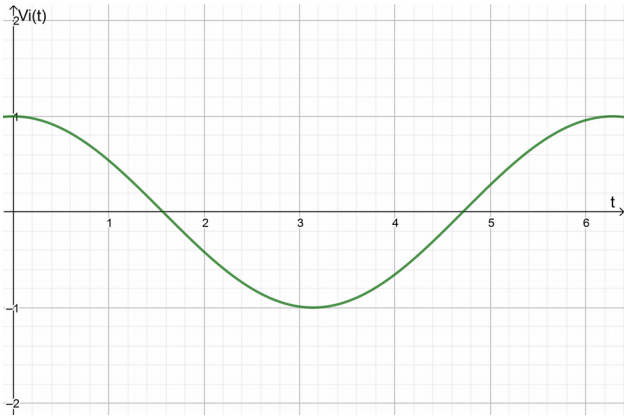
Condensador C

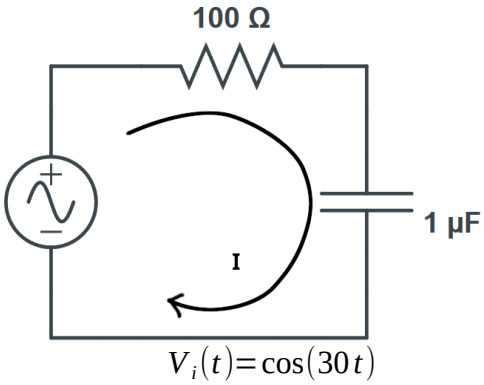
$I(t)=C\frac{dv}{dt}$

Bobina L

$V(t)=L\frac{d_i(t)}{dt}$

$V_i(t)=\cos(30t)$





Kirchoff

$$\cos(30t)=1000\,i+V_c=1000\cdot 10^{6}\frac{dV_c}{dt}+V_c$$

$i=C\frac{dV_c}{dt}$ porque están en serie

Queremos sacar V_c que es una función de tiempo, para ello son necesarios los números complejos

Números complejos

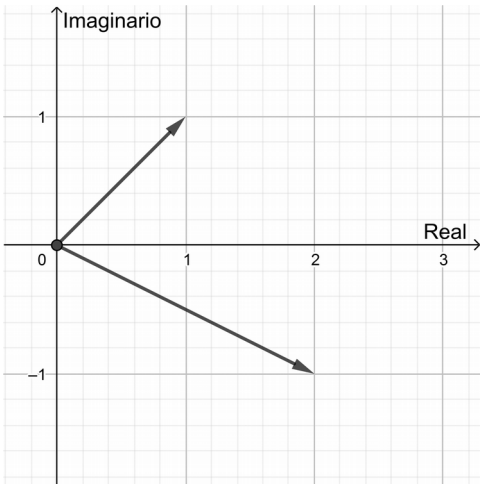
$X^2+1=0$ $\qquad a+b\cdot j$

$x^2=-1$

$X=\pm\sqrt{-1}=\pm j$

$(1+j)\cdot(2-j)=2-j+2j+(j)(-j)=3i$

$(\sqrt{-1})\cdot(-\sqrt{-1})=-(-1)=1$



1+j
2-j

3+0j

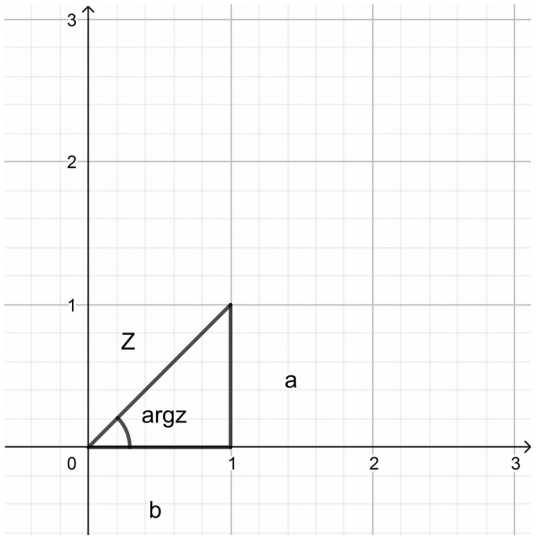
Formula de Euler

$e^{jx}=\cos(x)+j\cdot sen(x)$

Coordenadas polares

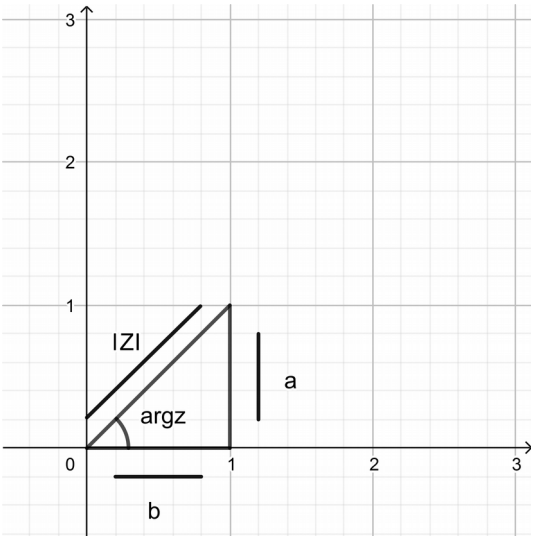
$|z|=\sqrt{a^2+b^2}$

$arg\, z=\arctan\left(\frac{b}{a}\right)$



$\tan\left(arg\, z\right)=\frac{b}{a}$

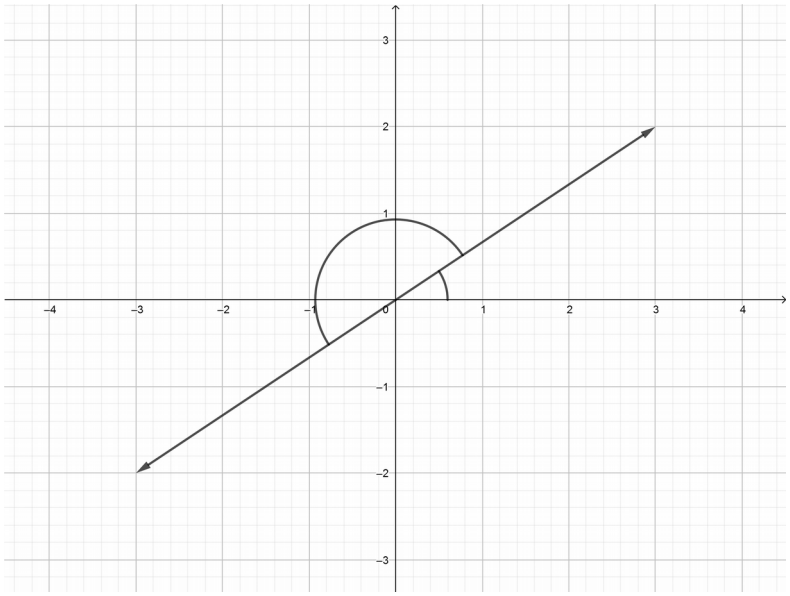
$arg\, z=\arctan\left(\frac{b}{a}\right)$



$3+2\,j$

$\arctan\left(\frac{2}{3}\right)=0{,}588$

$\arctan\left(\frac{-2}{-3}\right)=0{,}588+\pi$



$a = |z| \cos(arg\, z) \dfrac{a}{|z|}$

$b = |z|\, sen(arg\, z)$

$arg\, z \rightarrow \arctan(\dfrac{b}{a})$ *si* $a>0$ *ó* $\arctan(\dfrac{b}{a}) + \pi$ *si* $a<0$

$z = |z| \cos(arg\, z) + j|z|\, sen(arg\, z)$

$z = |z| \cos(arg\, z) + j\, sen(arg\, z) \quad \rightarrow \quad e^{j\, arg\, z}$

$z \quad = \quad |z| e^{j\, arg\, z} \quad = \quad a + b\, j$

forma polar forma binomial