

# Corrente Elétrica alternada

- **Corrente elétrica alternada**

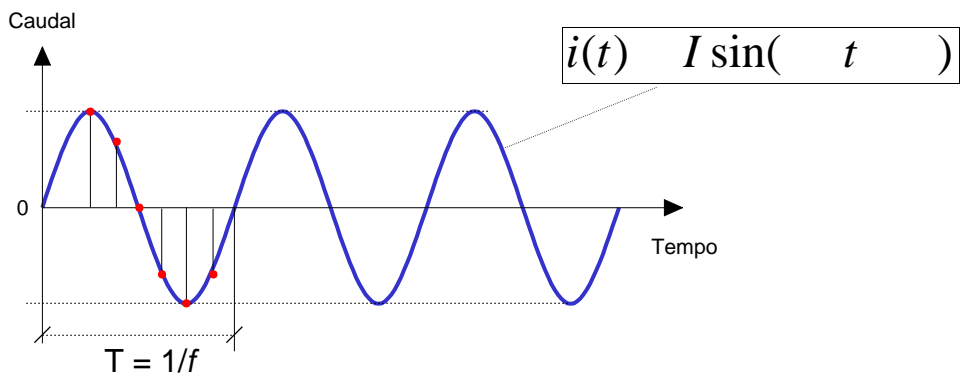
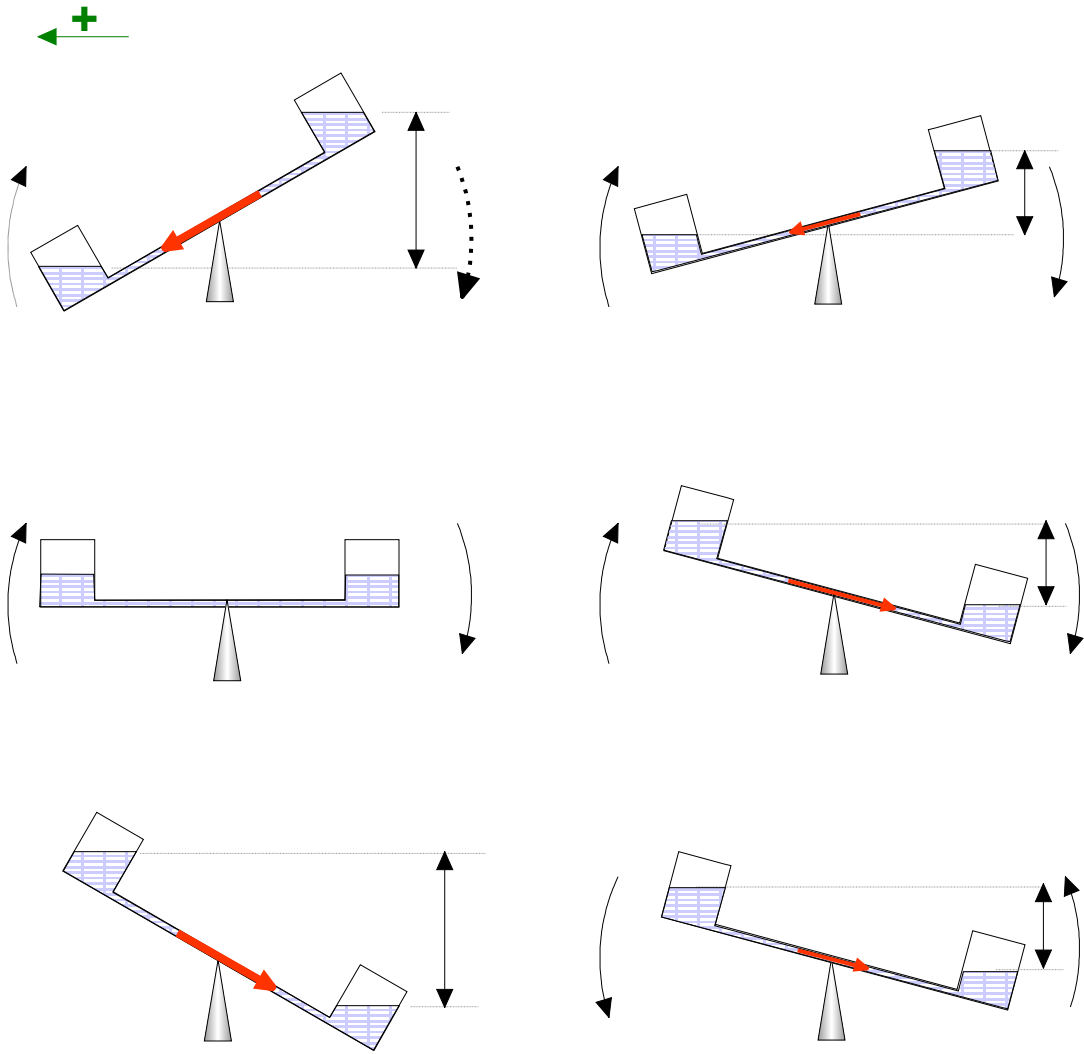
- Electromagnetismo

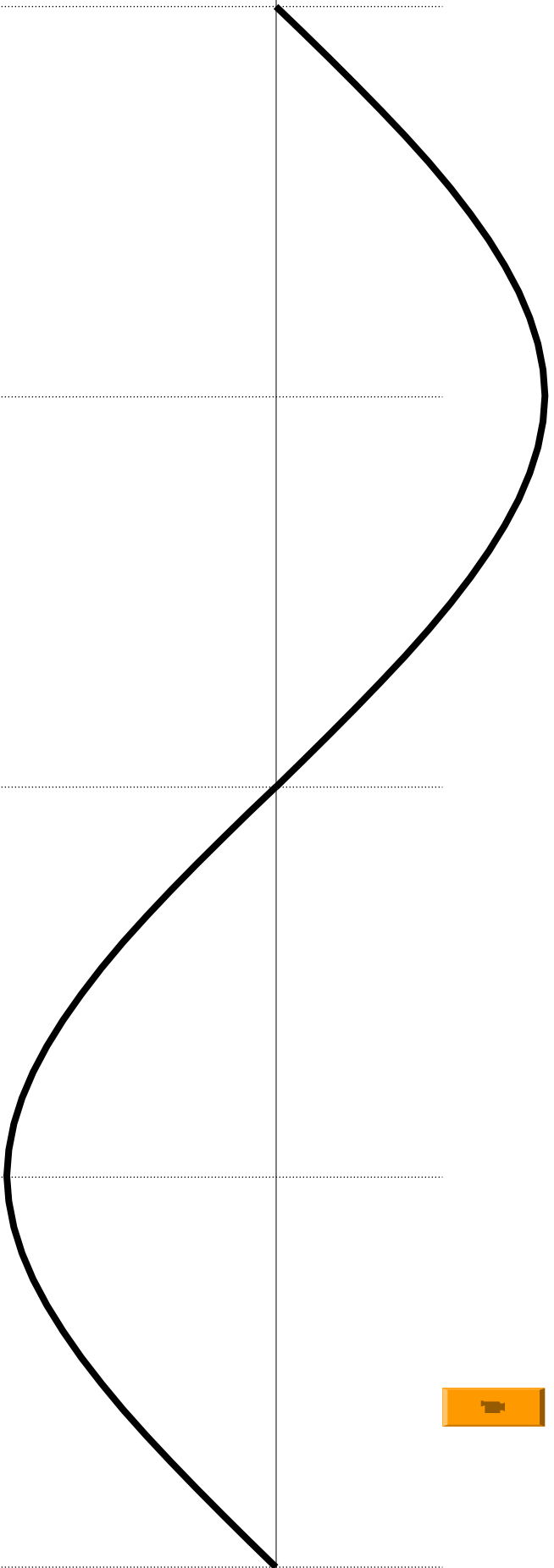
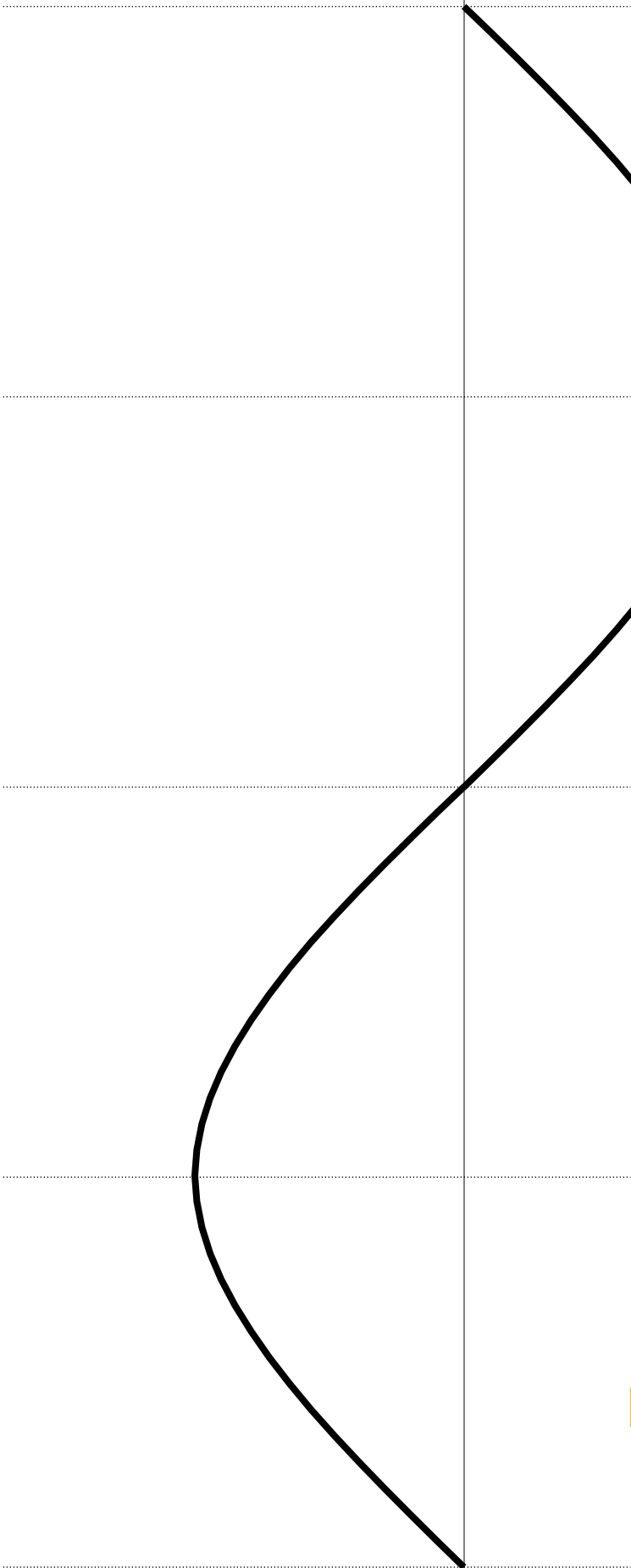
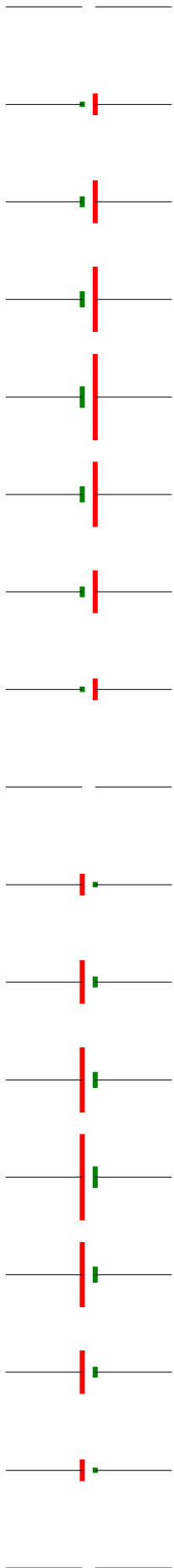
- Transformadores

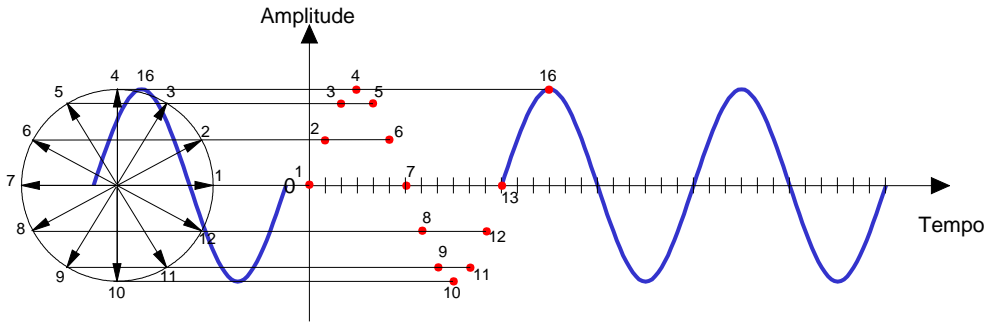
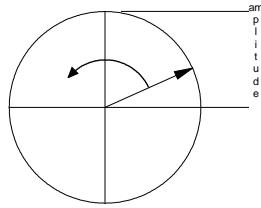
- Máquinas corrente contínua

- Máquinas corrente alternada

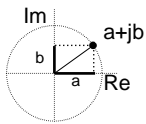
- Outras máquinas



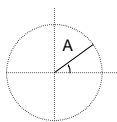




Representação / notação:

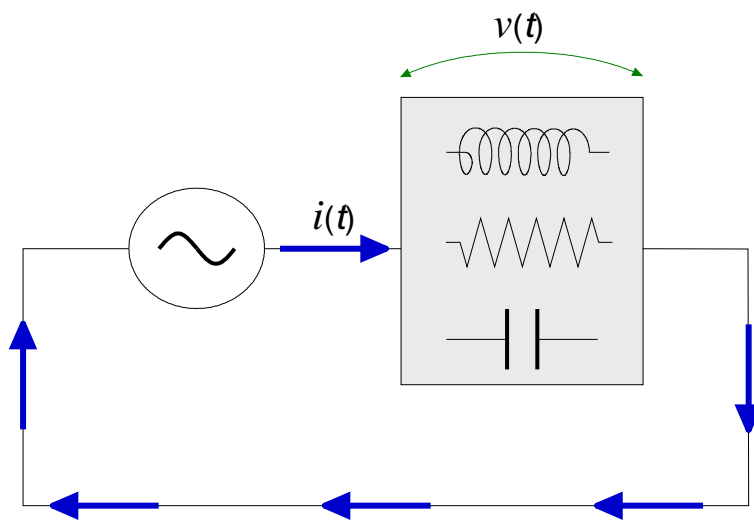


$$a + j b$$



$$A \angle$$

$$\left\{ \begin{array}{ll} \boxed{A \sqrt{a^2 + b^2}} & \boxed{\arctg \frac{b}{a}} \\ a = A \cos & b = A \sin \end{array} \right.$$

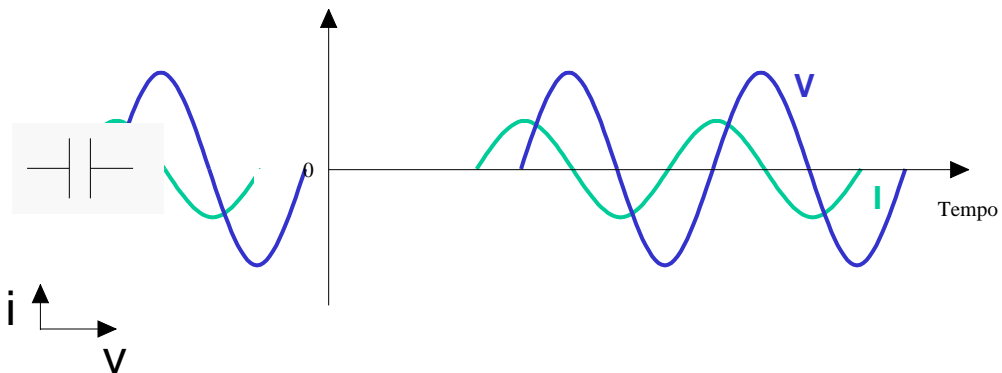
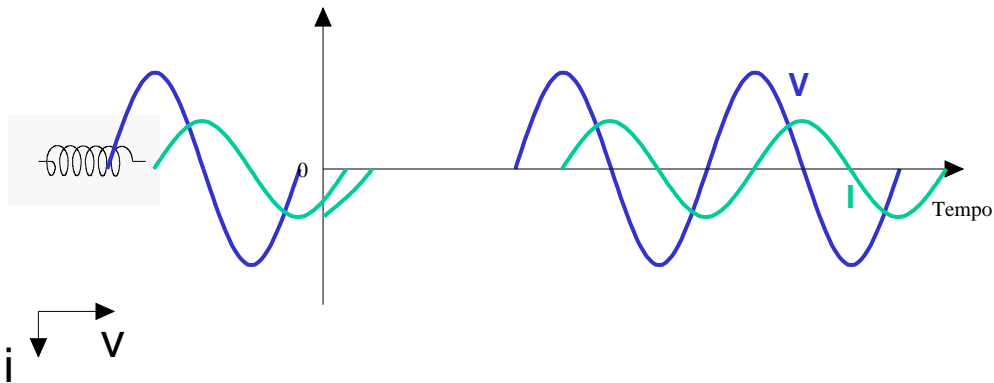
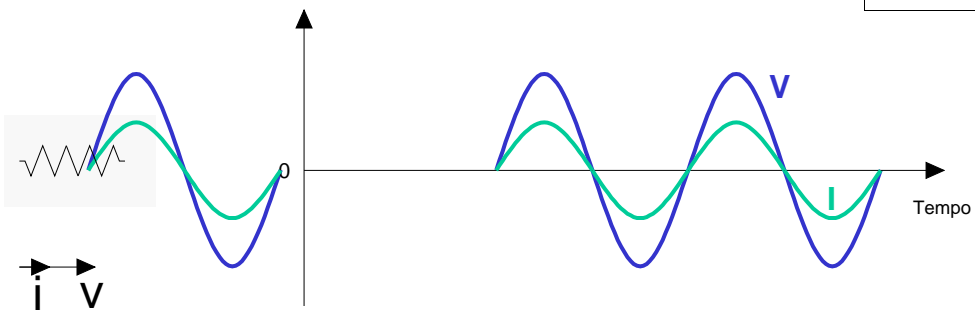


# Lei de Ohm (generalizada)

$$\bar{V} = \bar{Z} \bar{I}$$

$$\bar{I} = I \sin(\omega t + \phi)$$

$$\bar{V} = R I \sin(\omega t + \phi)$$

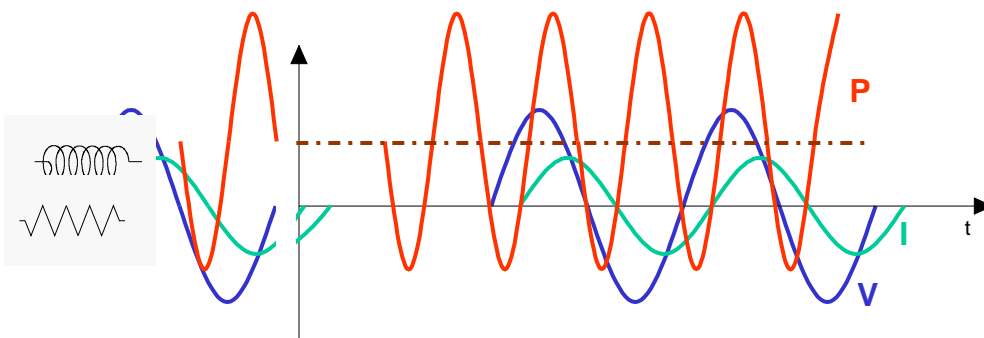
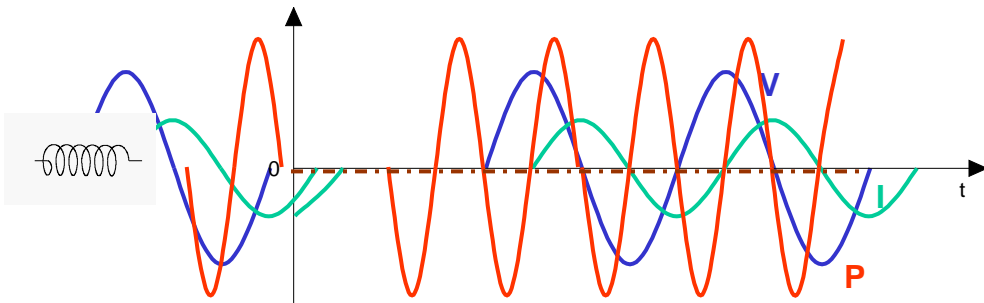
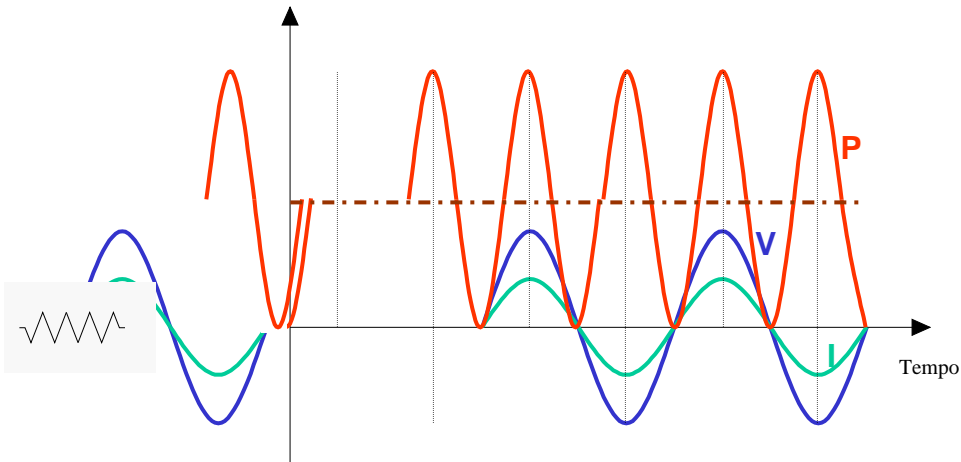


# Potência

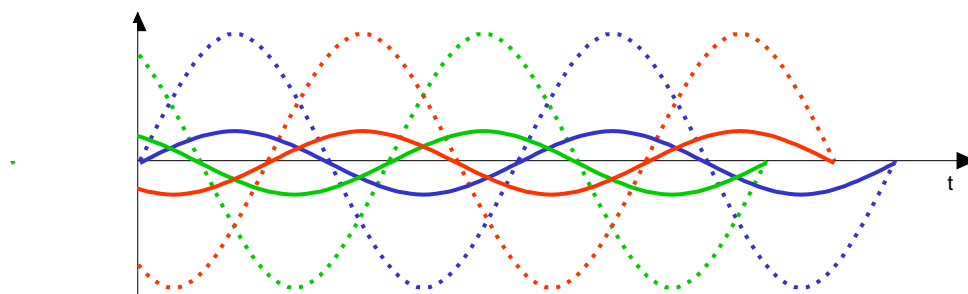
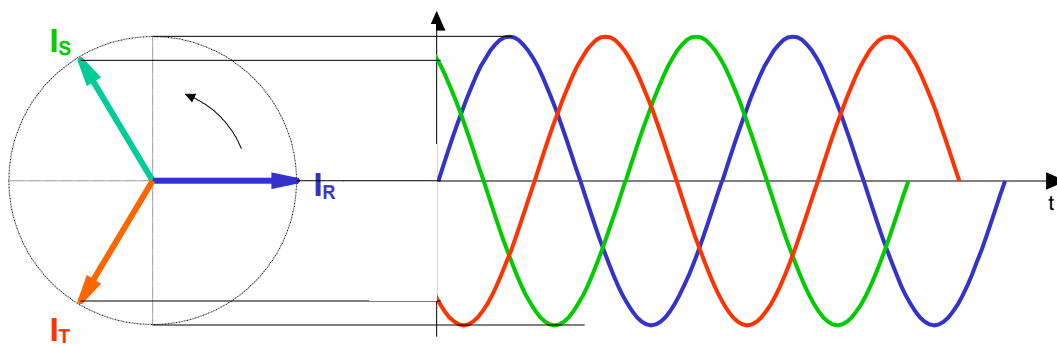
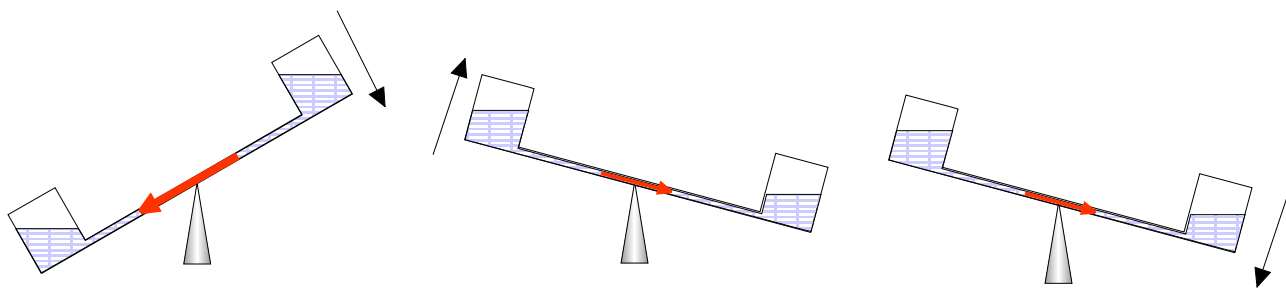
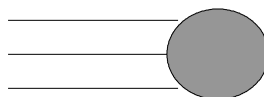
$$p(t) \quad v(t) \quad i(t)$$

$$v(t) = V \sin(\omega t)$$

$$i(t) = I \sin(\omega t - \phi)$$



# Corrente alternada trifásica





# Tipos de potência

*aparente*

$$S = V I$$

$$S = \sqrt{3} V I$$

*activa*

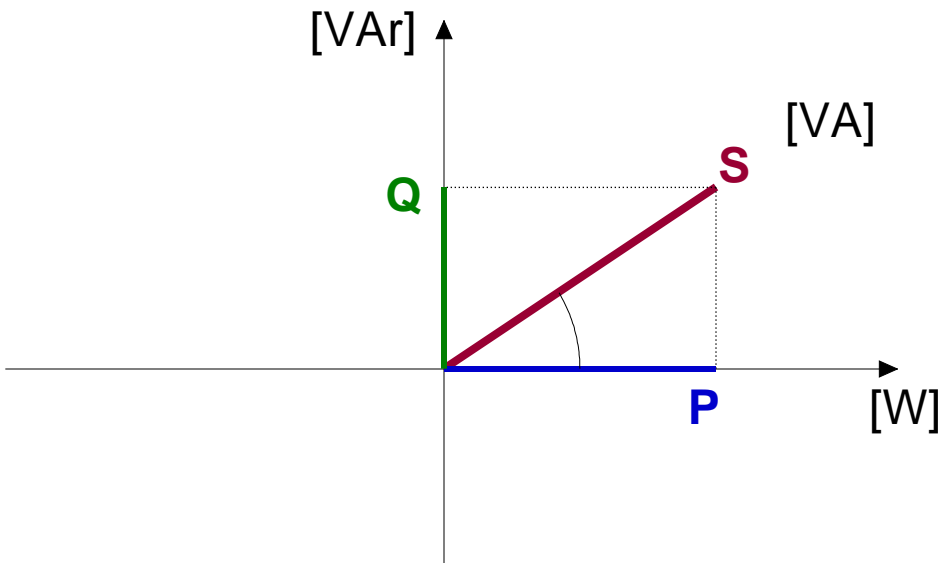
$$P = V I \cos$$

$$P = \sqrt{3} V I \cos$$

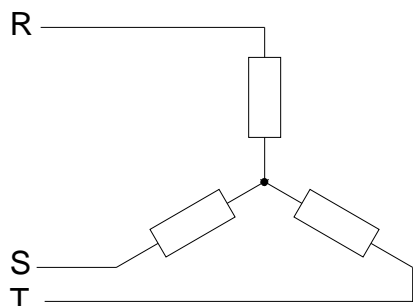
*reactiva*

$$Q = V I \sin$$

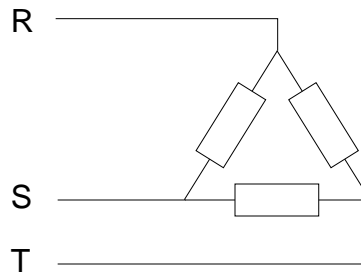
$$Q = \sqrt{3} V I \sin$$



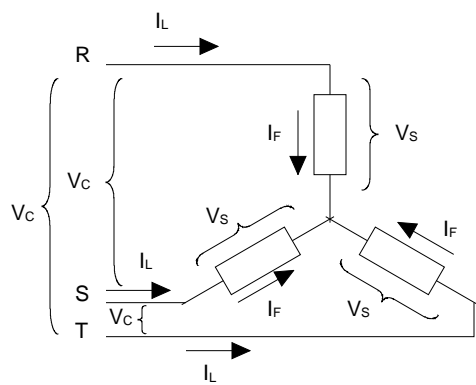
Factor de potência:  $\cos \frac{P}{S}$



Estrela

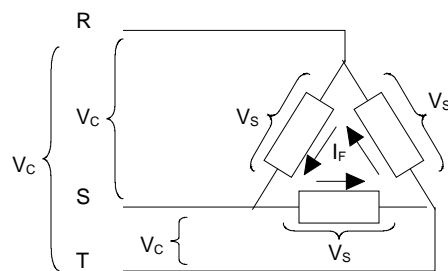


Triângulo



$$V_C = \sqrt{3} V_S$$

$$I_L = I_F$$



$$V_C = V_S$$

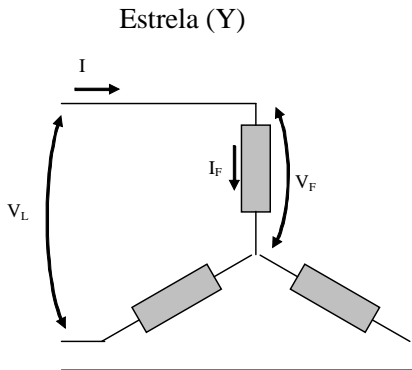
$$I_L = \sqrt{3} I_F$$

$$P_{3f} = 3 P_{1f}$$

Partindo da expressão da potência, neste caso a potência activa, para um sistema trifásico:

$$P_{3f} = \sqrt{3} V_L I_L \cos$$

e sabendo que as tensões e correntes, nos dois tipo de ligação dos sistemas trifásicos, são as seguintes:

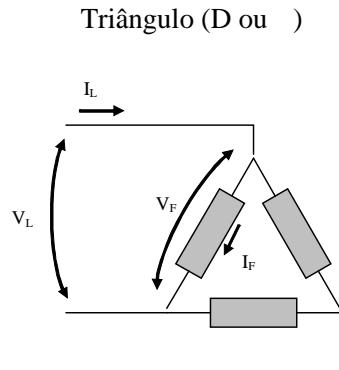


$$V_L = \sqrt{3} V_F$$

$$I_L = I_F$$

$$P_{3f} = \sqrt{3} \sqrt{3} V_F I_L \cos$$

$$= 3 V_F I_F \cos$$



$$V_L = V_F$$

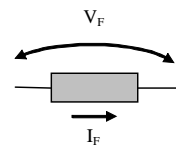
$$I_L = \sqrt{3} I_F$$

$$P_{3f} = \sqrt{3} V_F \sqrt{3} I_F \cos$$

$$= 3 V_F I_F \cos$$

$$P_{3f} = 3 V_F I_F \cos$$

como  $V_F I_F \cos = P_{1f}$



então, segue-se que:  $P_{3f} = 3 P_{1f}$

Isto é a potência, num sistema trifásico (Y ou D) é igual a três vezes a potência em uma das fases

- Corrente eléctrica alternada
- Electromagnetismo**
- Transformadores
- Máquinas corriente contínua
- Máquinas corrente alternada
- Outras máquinas