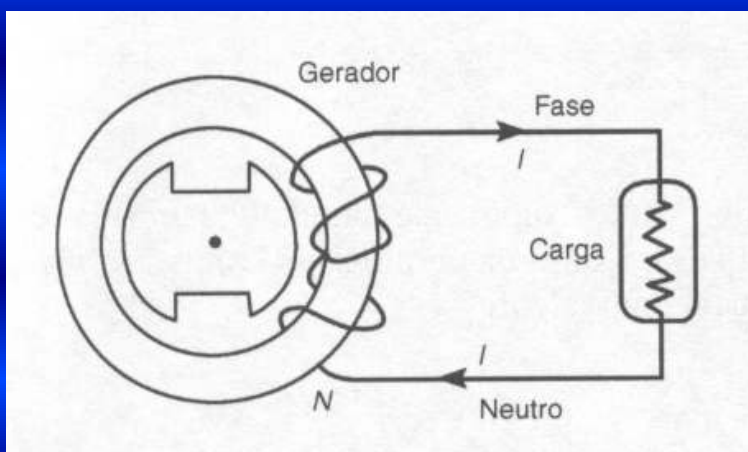
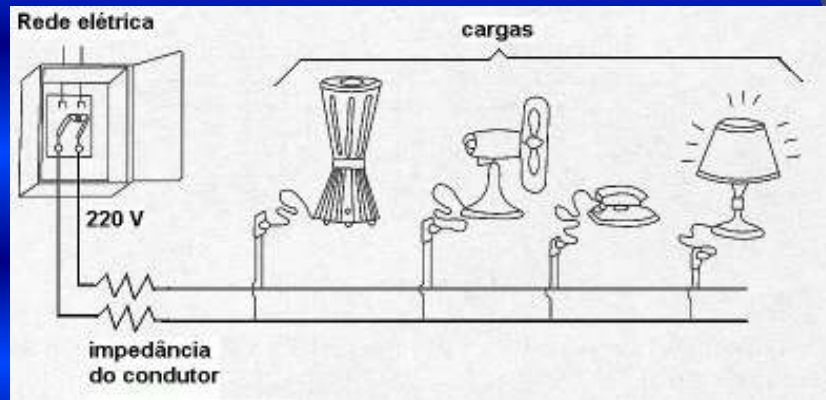


Eletricidade Aplicada II  
**SISTEMAS  
MULTIPOLARES**

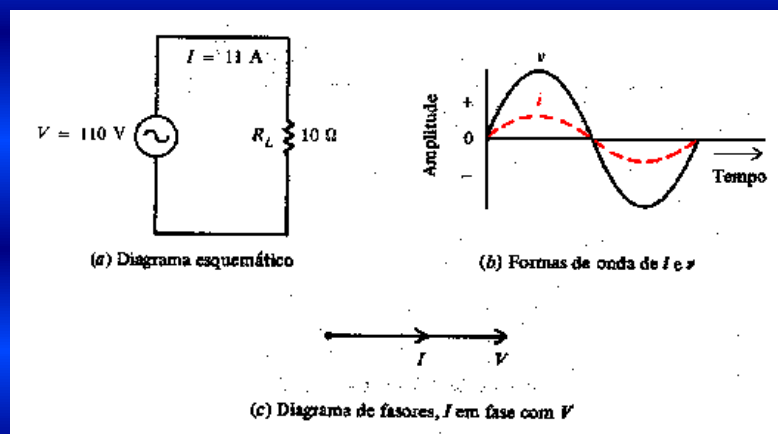
**Circuitos Bipolares**



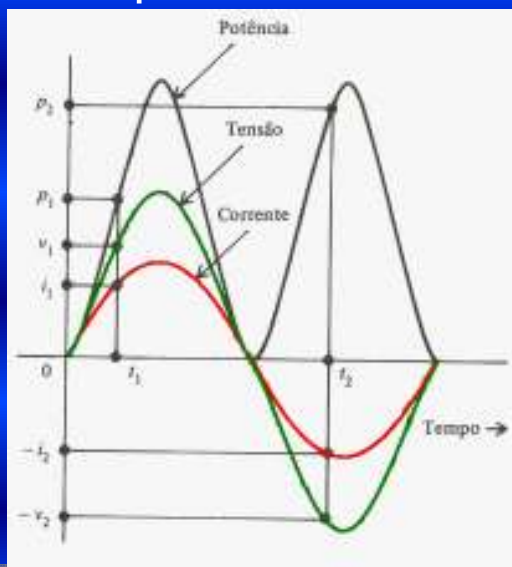
## Circuitos Bipolares



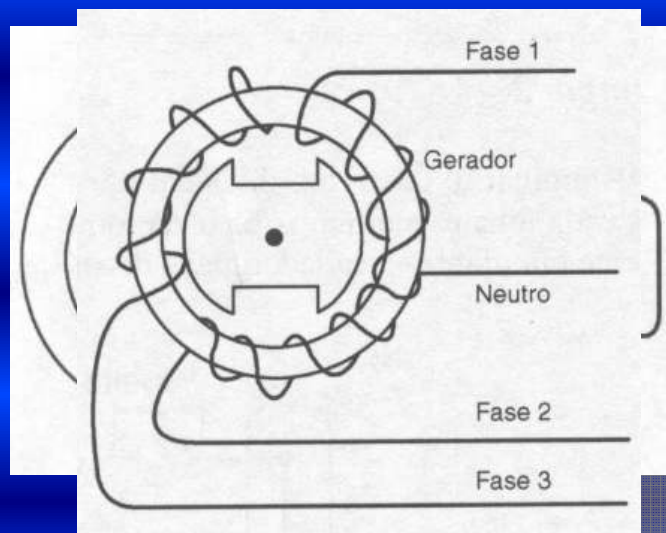
## Circuitos Bipolares



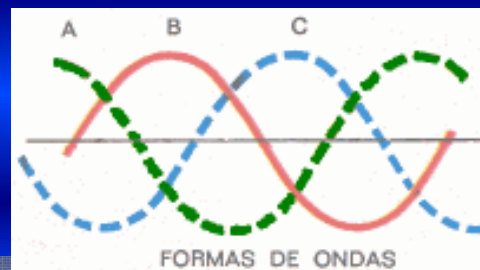
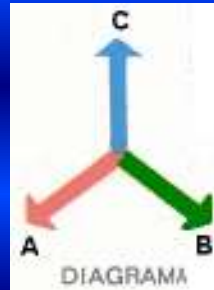
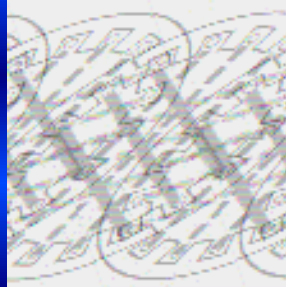
## Circuitos Bipolares



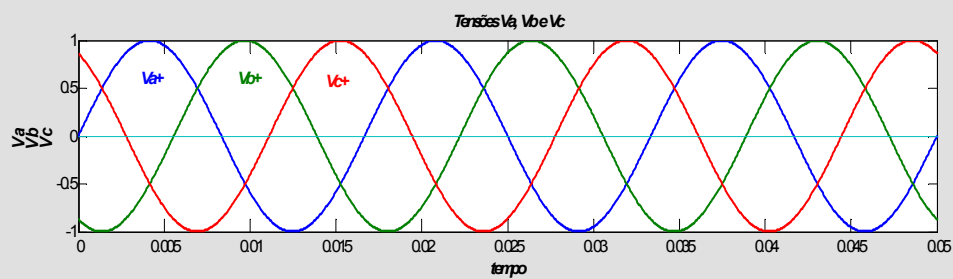
## Geração trifásica



## Geração trifásica



## Geração trifásica



## Sistema trifásico

$$\begin{aligned}v_a &= V.\text{sen}(wt) & i_a &= I.\text{sen}(wt - \varphi) \\v_b &= V.\text{sen}\left(wt - \frac{2\pi}{3}\right) & i_b &= I.\text{sen}\left(wt - \frac{2\pi}{3} - \varphi\right) \\v_c &= V.\text{sen}\left(wt + \frac{2\pi}{3}\right) & i_c &= I.\text{sen}\left(wt + \frac{2\pi}{3} - \varphi\right)\end{aligned}$$

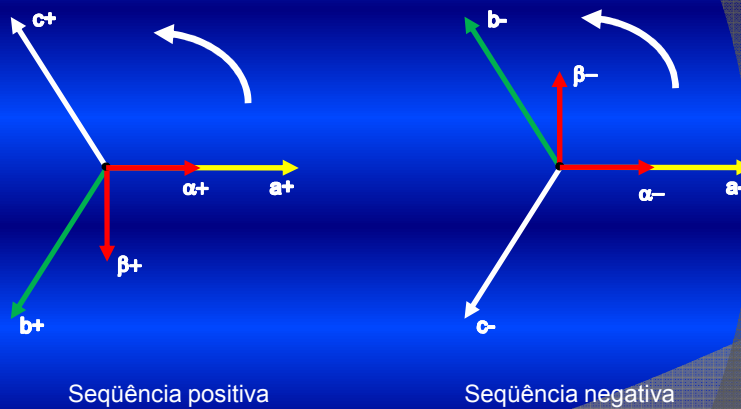
## Vantagens de sistemas polifásicos

- Potência instantânea praticamente constante
- Correntes menores que os sistemas monofásicos.

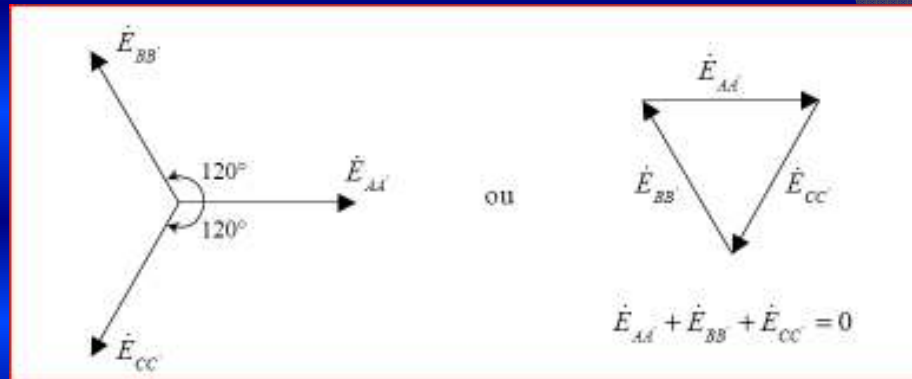
## Potência elétrica instantânea

- Circuito monofásico:  $P = V \cdot I$
- Circuito trifásico:  $P = 3 \cdot V_{rms} \cdot I_{rms} \cdot \cos \varphi$

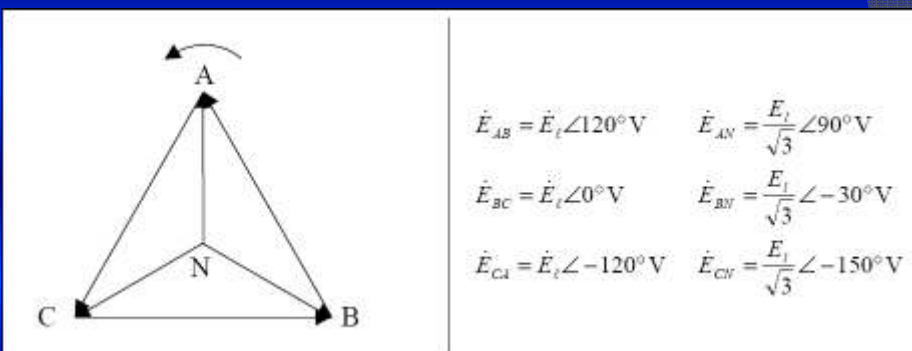
## Diagrama Fasorial:



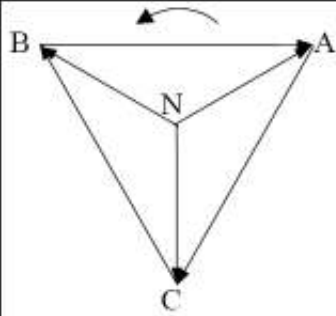
## Diagrama Fasorial:



## Seqüência ABC:

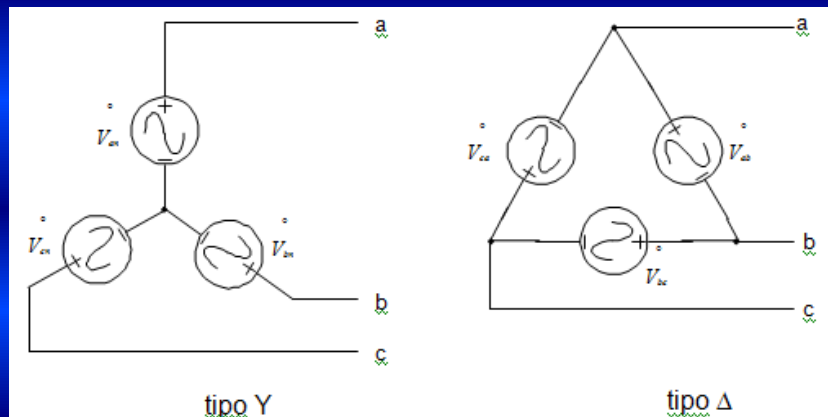


## Seqüência CBA:



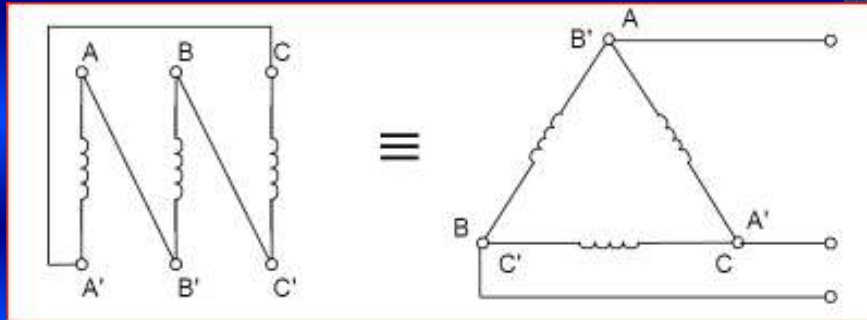
$$\begin{aligned} \dot{E}_{AB} &= E_l \angle 0^\circ \text{ V} & \dot{E}_{AN} &= \frac{E_l}{\sqrt{3}} \angle 30^\circ \text{ V} \\ \dot{E}_{BC} &= E_l \angle 120^\circ \text{ V} & \dot{E}_{BN} &= \frac{E_l}{\sqrt{3}} \angle 150^\circ \text{ V} \\ \dot{E}_{CA} &= E_l \angle -120^\circ \text{ V} & \dot{E}_{CN} &= \frac{E_l}{\sqrt{3}} \angle -90^\circ \text{ V} \end{aligned}$$

## Tipos de ligações

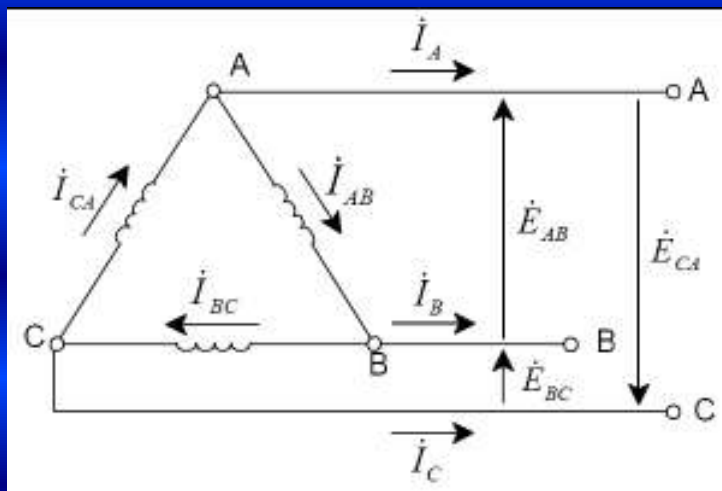




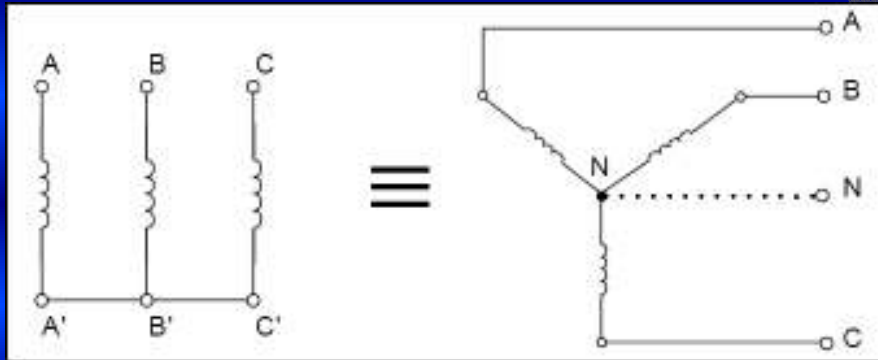
## Ligação triângulo



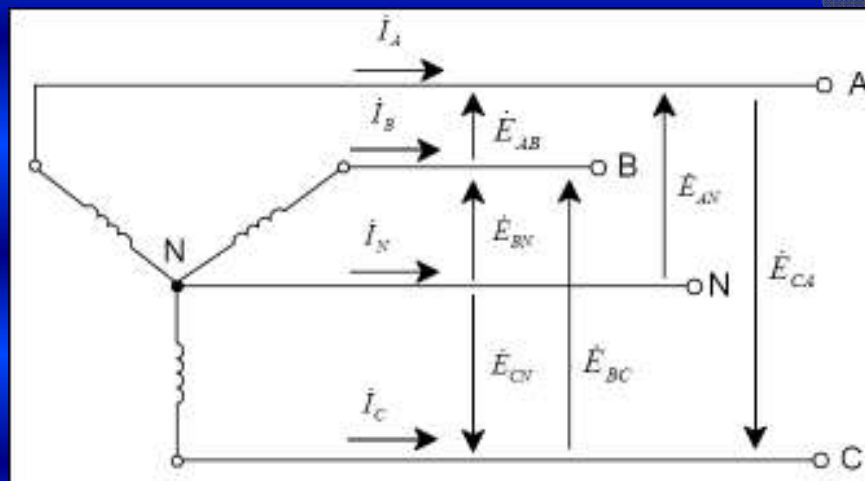
## Ligação triângulo



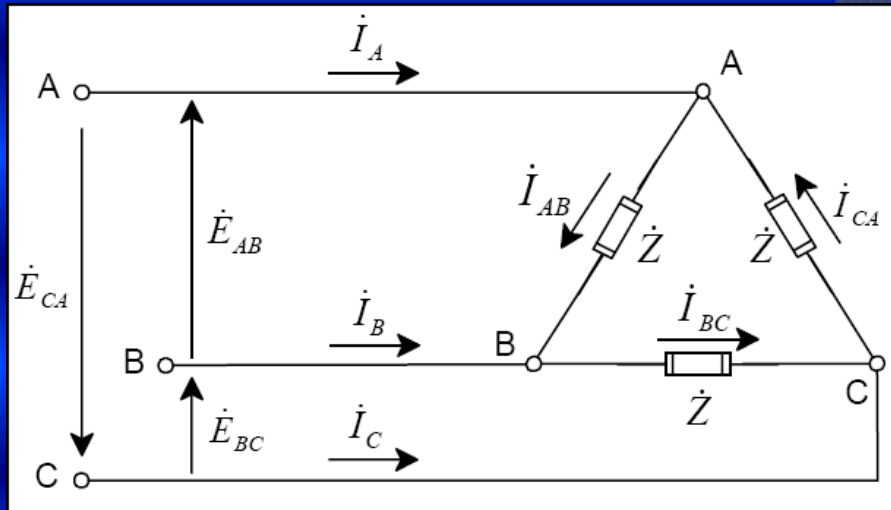
## Ligação Estrela



## Ligação Estrela



## Exercício 1



## Exercício 2 (seq CBA)

