

Sequência de conteúdos:

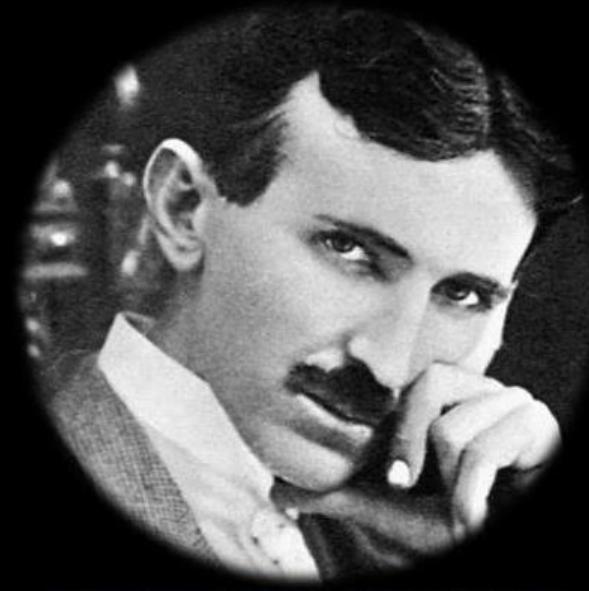
1. Princípios de corrente alternada.

THOMAS EDSON



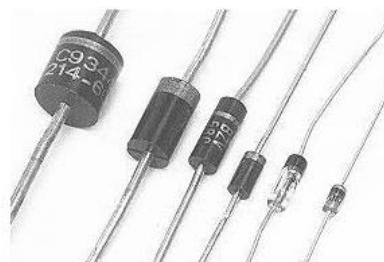
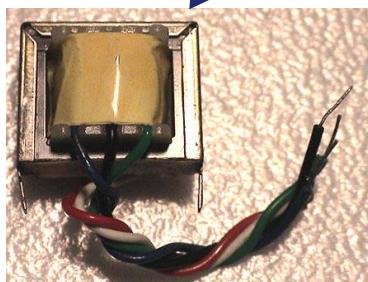
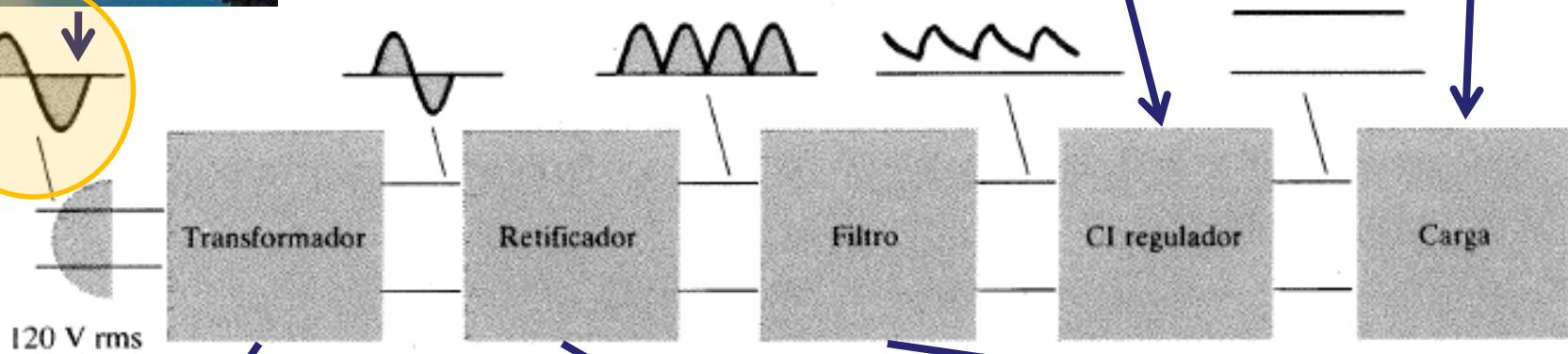
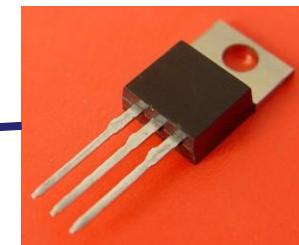
CORRENTE CONTINUA

NIKOLA TESLA



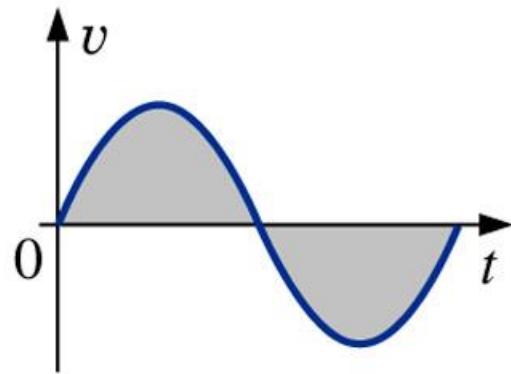
CORRENTE ALTERNADA

Estrutura da fonte linear

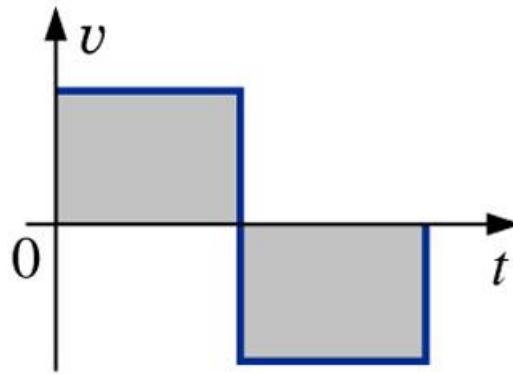


Corrente alternada

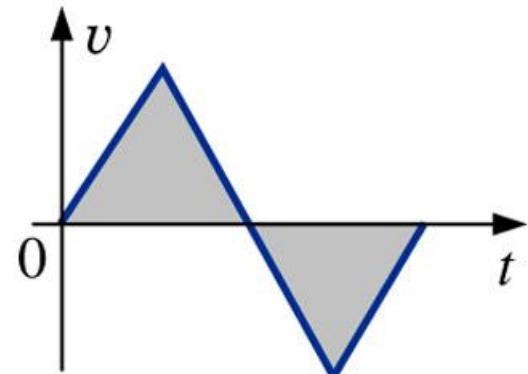
Formas de onda alternadas:



Sinusoidal

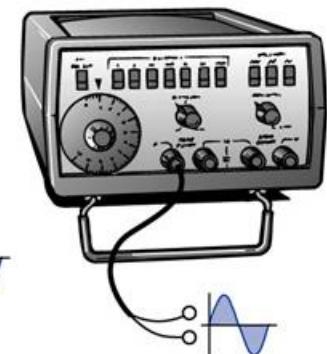
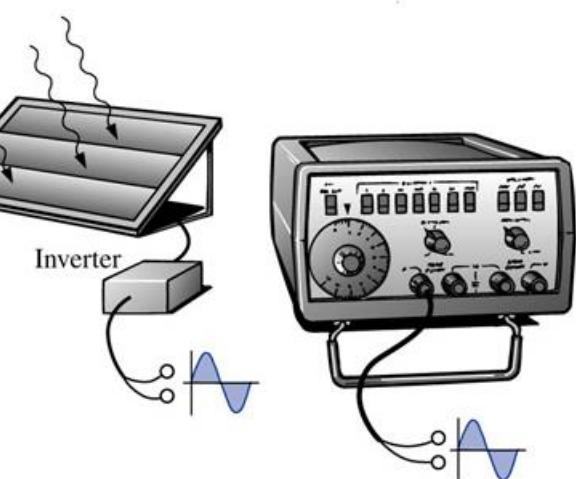
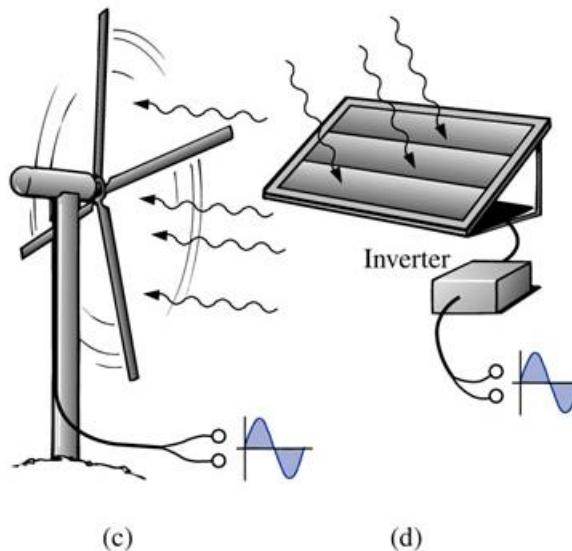
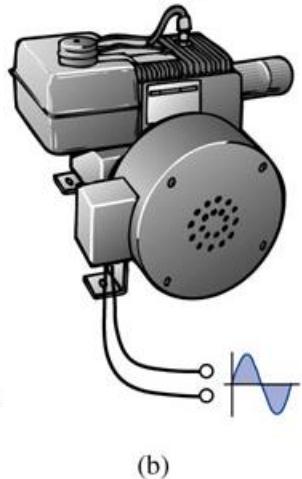
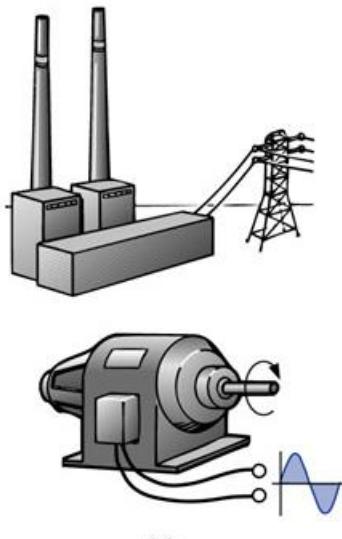


Square wave



Triangular wave

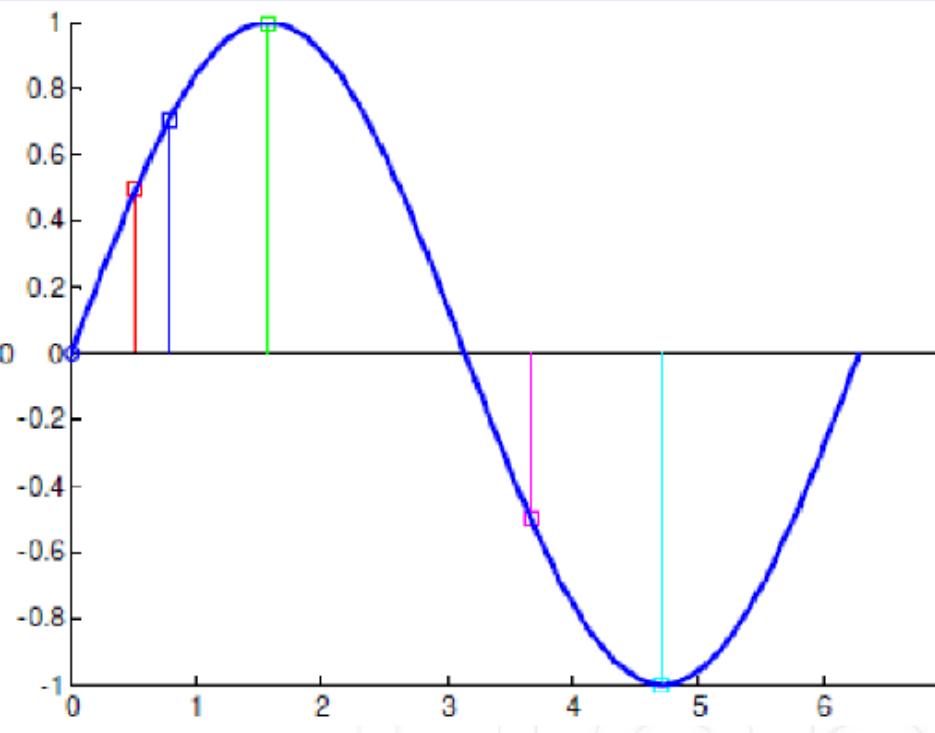
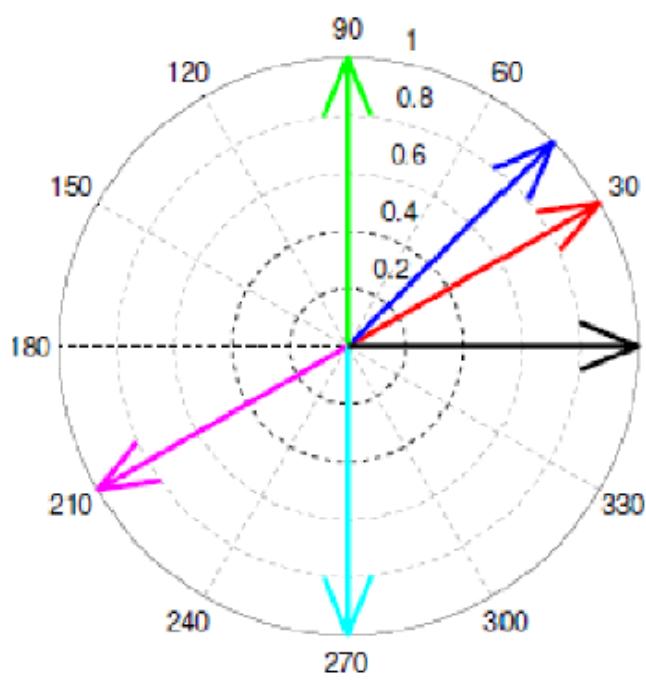
Fontes de corrente alternada:



Corrente alternada

Senóide

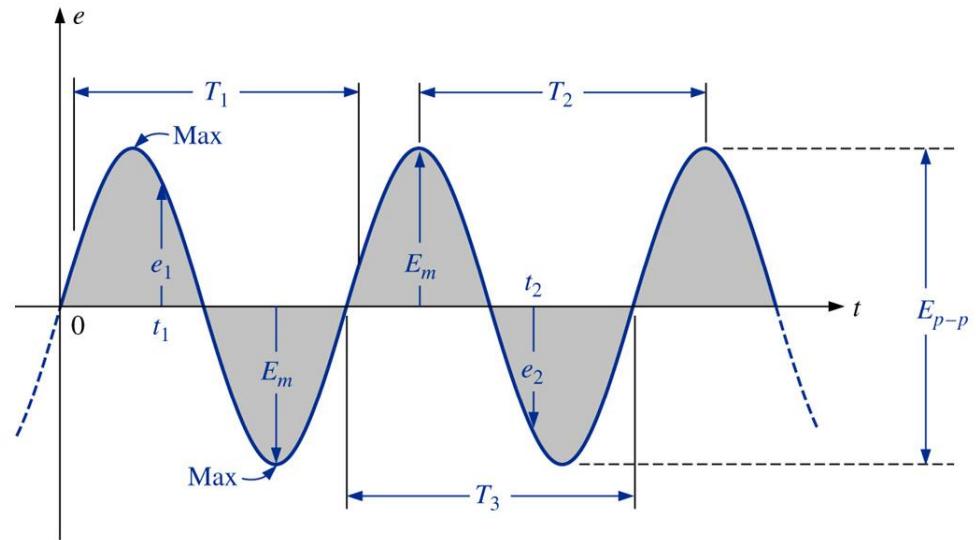
É a projeção vertical de um vetor de amplitude A, que gira com velocidade angular ω em torno da sua origem.



Principais parâmetros de um sinal senoidal

Definições:

1. Forma de onda;
2. Valor instantâneo;
3. Amplitude de pico;
4. Valor de pico;
5. Valor pico a pico;
6. Forma de onda periódica;
7. Período (T);
8. Ciclo;
9. Frequência (f).



Amplitude de um sinal senoidal

Forma de onda:

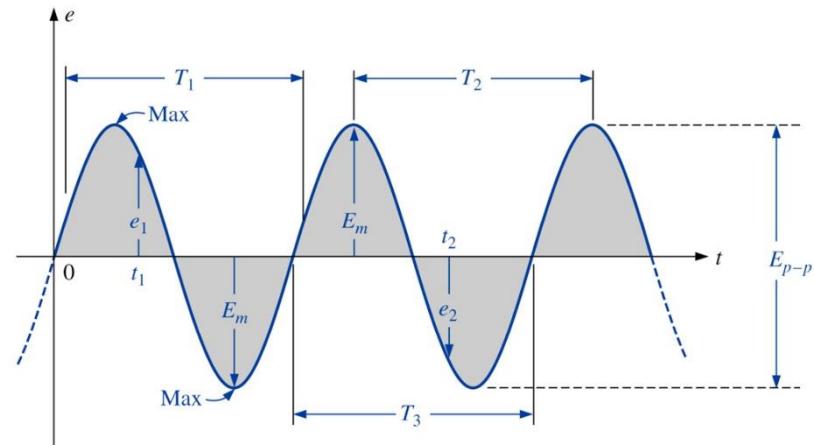
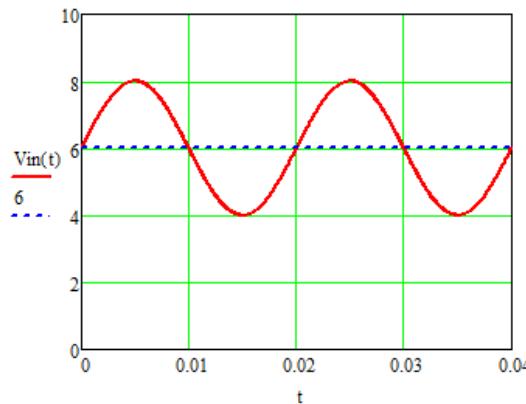
Gráfico de uma grandeza em função de uma variável como o tempo, posição, graus, radianos, temperatura, entre outros.

Valor instantâneo:

Amplitude de uma forma de onda em um instante de tempo qualquer.

Amplitude de pico:

Valor máximo de uma forma de onda em relação ao valor médio.



Amplitude de um sinal senoidal

Valor de pico:

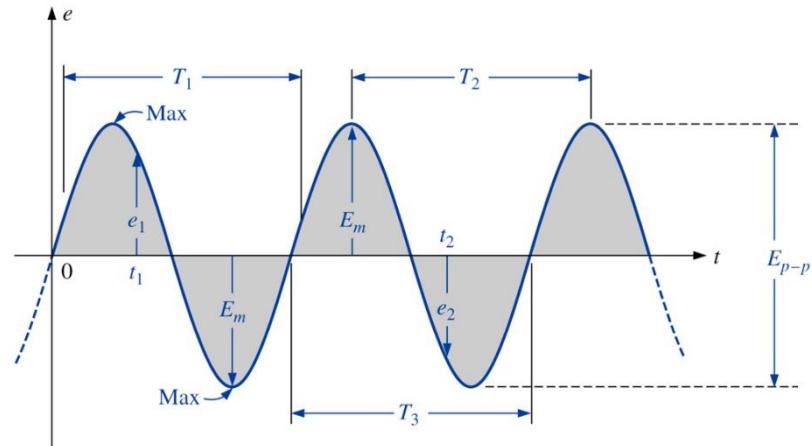
Valor máximo de uma função medido a partir do nível zero.

Valor pico a pico:

Diferença entre os valores dos picos positivo e negativo, isto é, a soma dos módulos das amplitudes positiva e negativa.

Forma de onda periódica:

Forma de onda que se repete continuamente após um certo intervalo de tempo constante.



Frequência de um sinal senoidal

Período (T):

Intervalo de tempo entre repetições sucessivas de uma forma de onda periódica.

Ciclo:

Parte de uma forma de onda contida em um intervalo de tempo igual a um período.

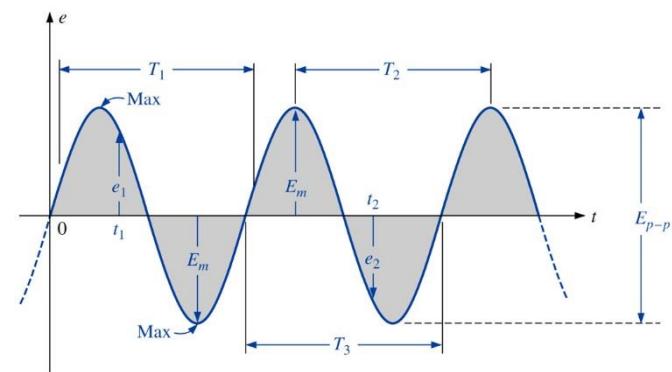
Freqüência (f):

Número de ciclos que ocorrem em 1 s.

$$1 \text{ hertz (Hz)} = 1 \text{ ciclo por segundo (c/s)}$$

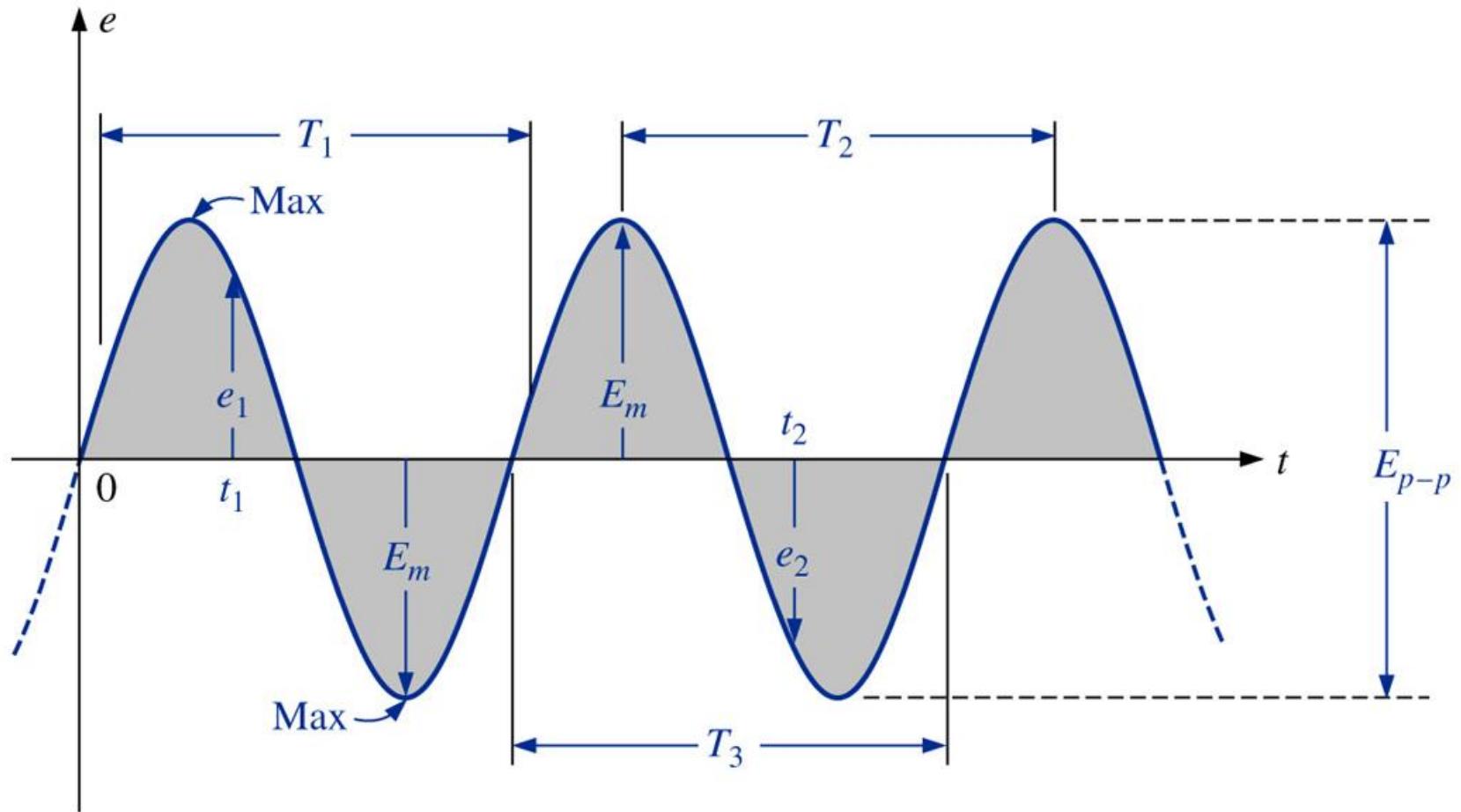
$$f = \frac{1}{T} [\text{Hz}]$$

$$T = \frac{1}{f} [s]$$



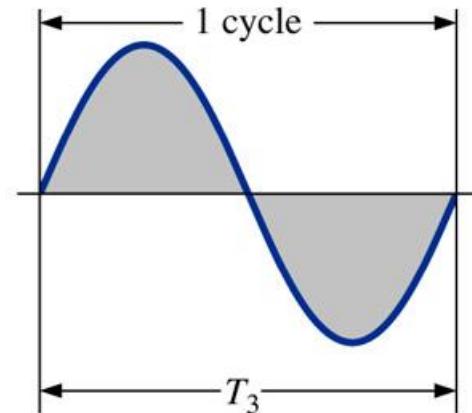
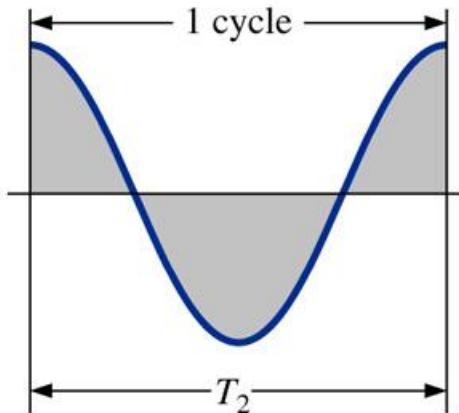
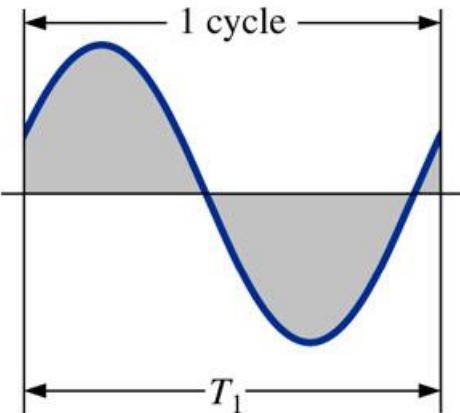
Frequência de um sinal senoidal

Parâmetros importantes de uma tensão senoidal:



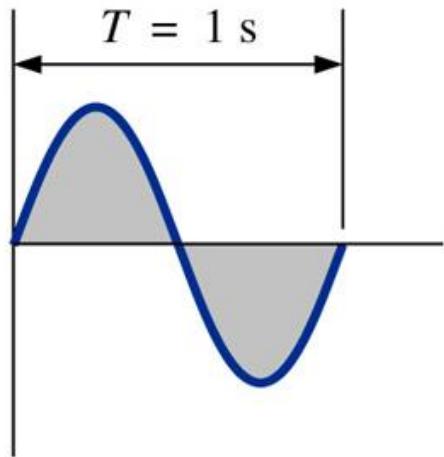
Frequência de um sinal senoidal

Definição de um ciclo e período de uma forma de onda:

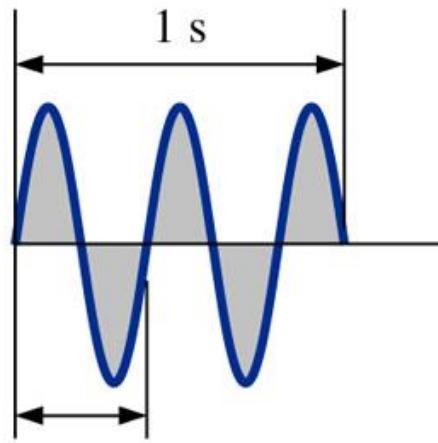


Frequência de um sinal senoidal

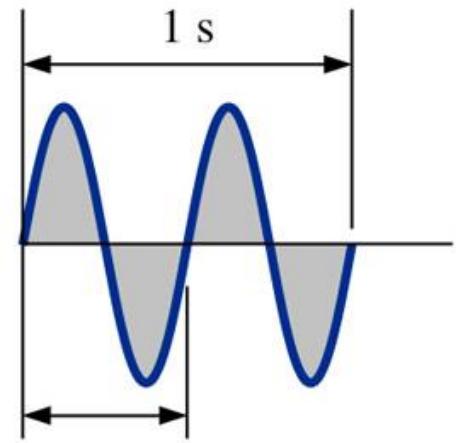
Efeito da mudança de frequência sobre o período:



(a)



(b)



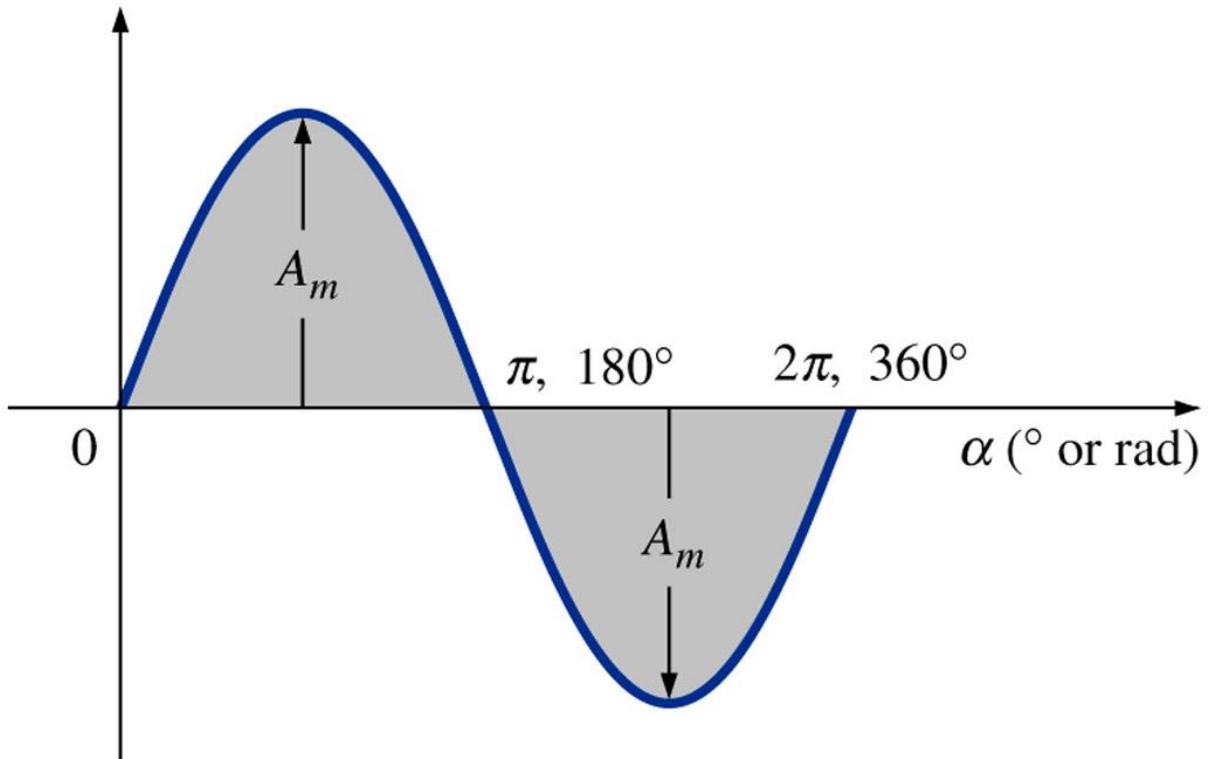
(c)

Expressão matemática de um sinal senoidal

A senóide, expressão geral:

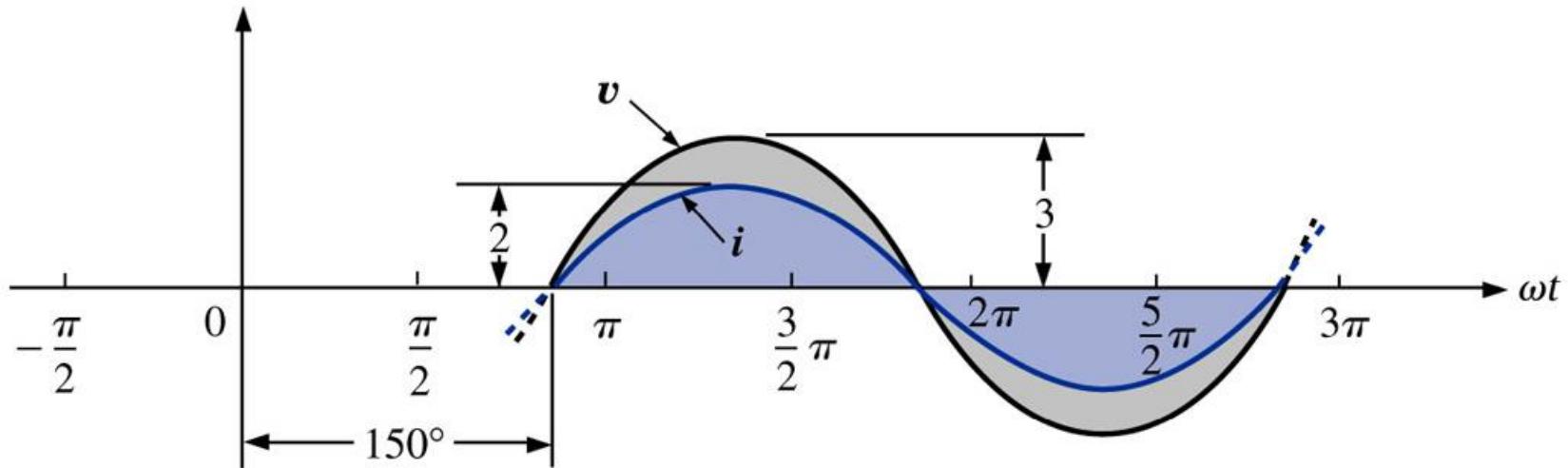
$$v(t) = V_p \cdot \sin(\omega \cdot t + \phi)$$

Onde: $\omega = 2\pi f$



Defasagem

A senóide, defasagem:

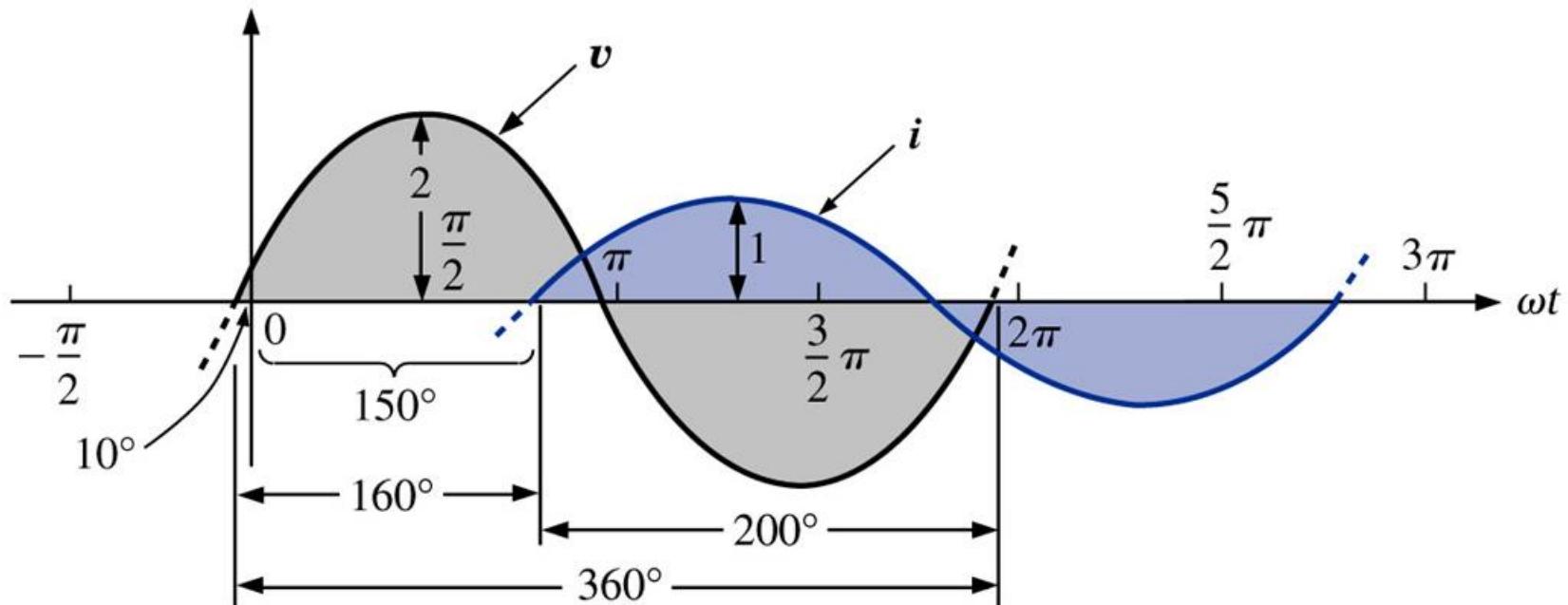


Sinais em fase

$$v(t) = V_p \cdot \sin(\omega \cdot t + \phi)$$

Defasagem

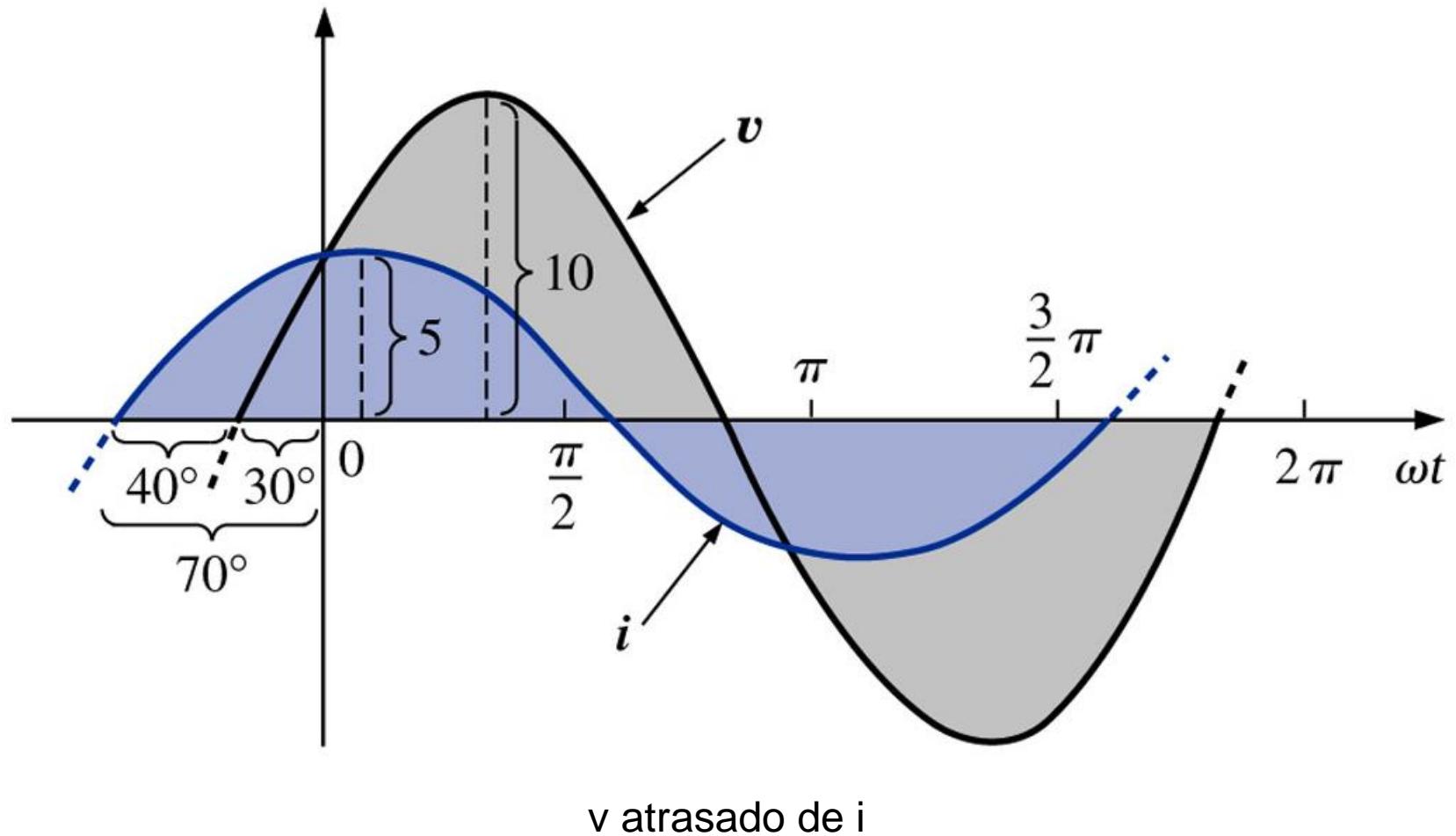
A senóide, defasagem:



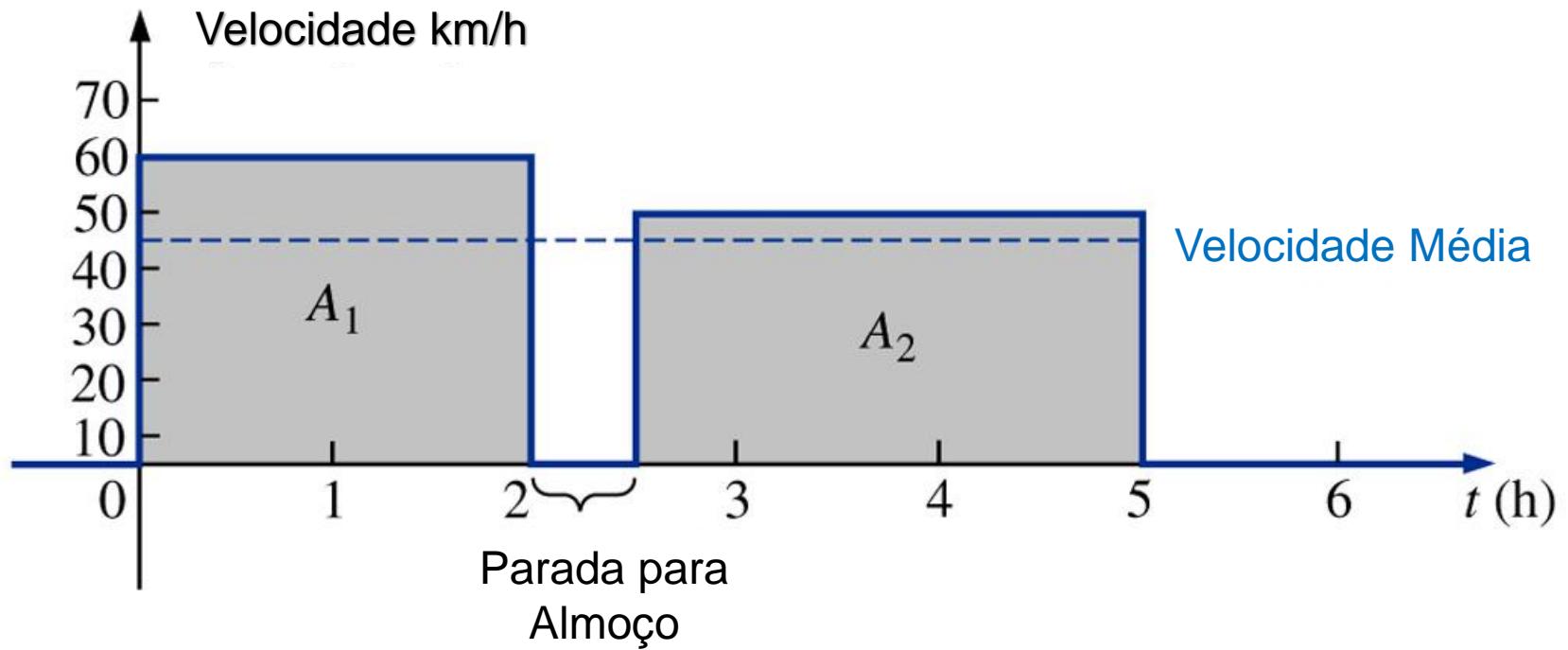
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Defasagem

A senóide, defasagem:

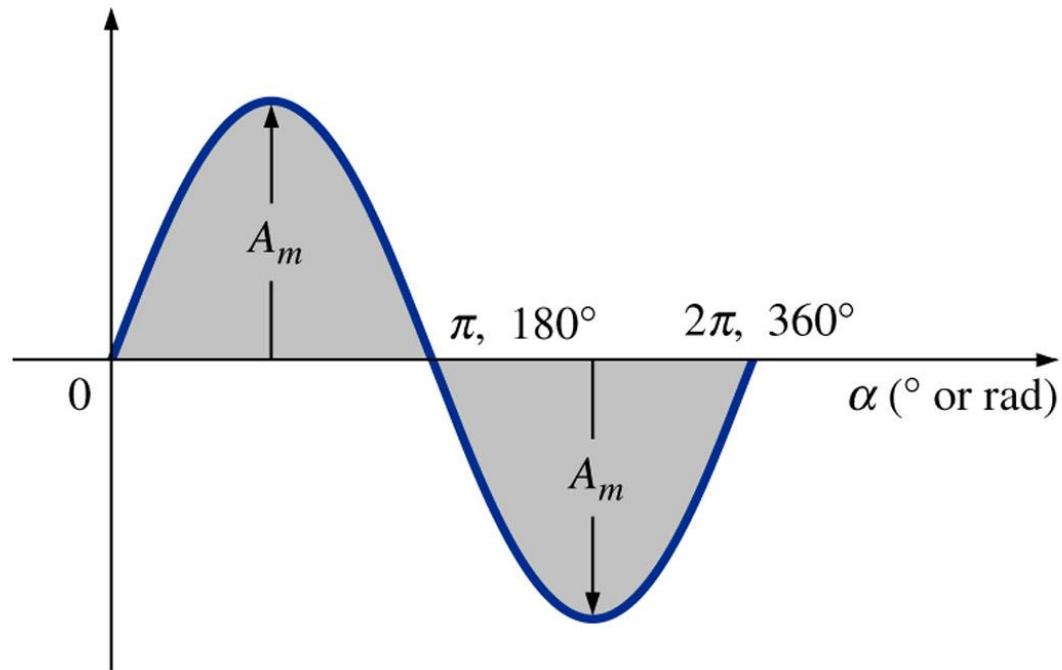


A senóide, valor médio:



$$v_{\text{med}} = \frac{60 \cdot 2 + 50 \cdot 2,5}{5} = 49 \text{ km/h}$$

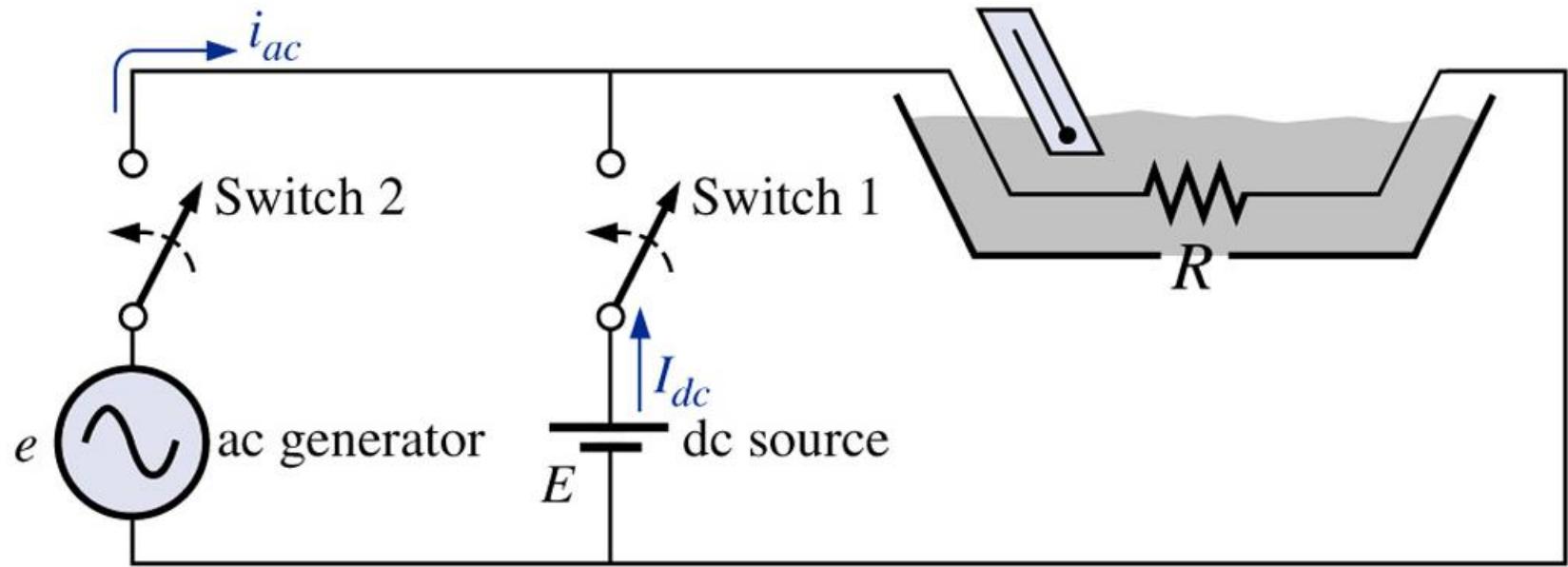
A senóide, valor médio:



O valor médio de um sinal senoidal é zero.

Valor eficaz (RMS: Root Mean Square)

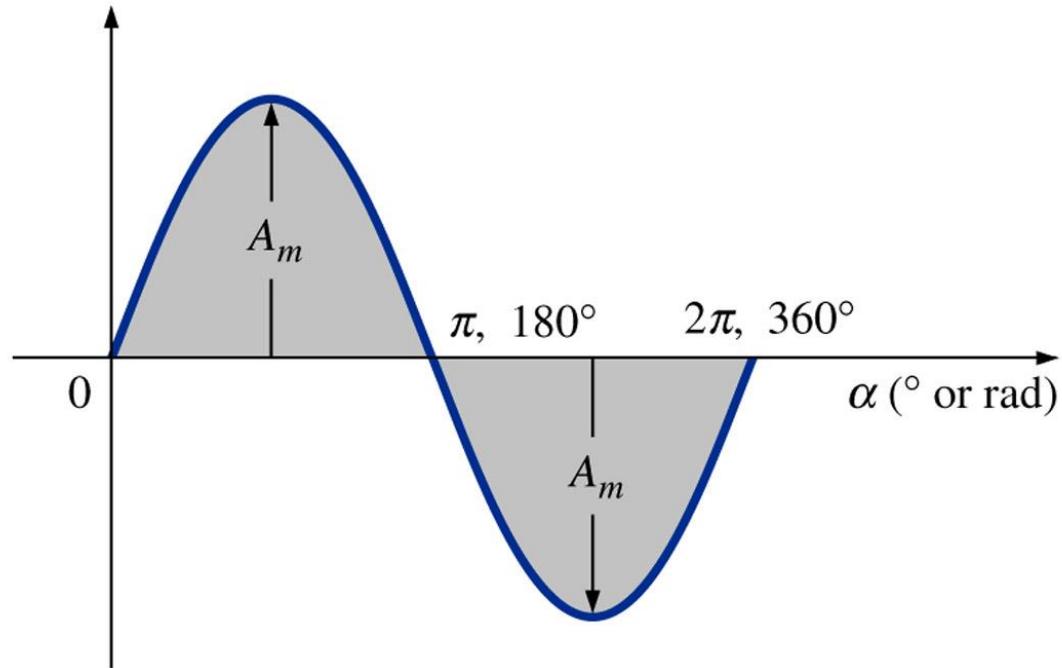
A senóide, valor eficaz:



O valor equivalente a ao efeito de uma fonte CC de uma tensão ou corrente senoidal vale 0,707 do seu valor máximo.

$$0,707 = \left(1/\sqrt{2}\right)$$

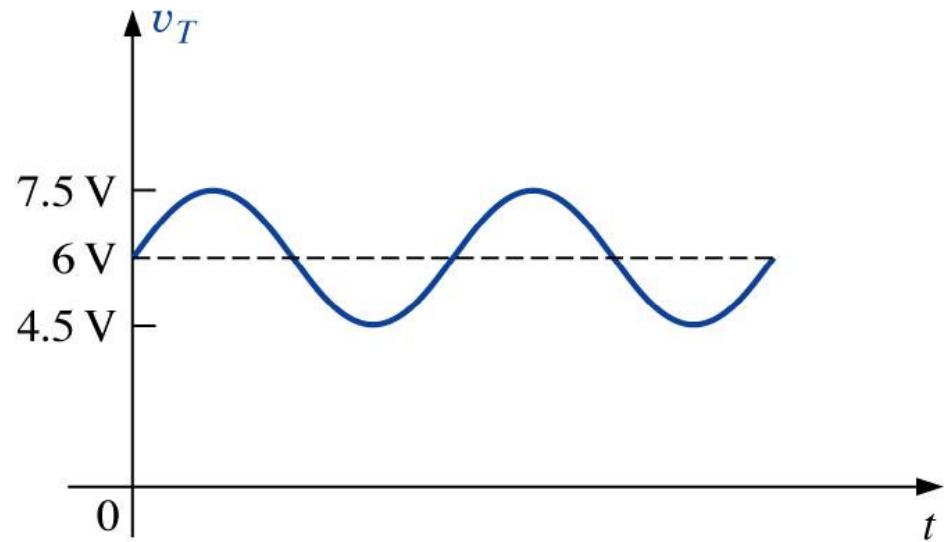
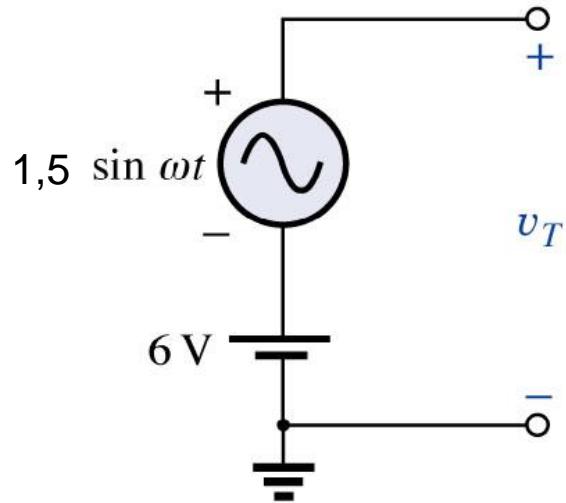
A senóide, valor eficaz:



$$V_{rms} = \frac{V_p}{\sqrt{2}} = 0,707 \cdot V_p$$

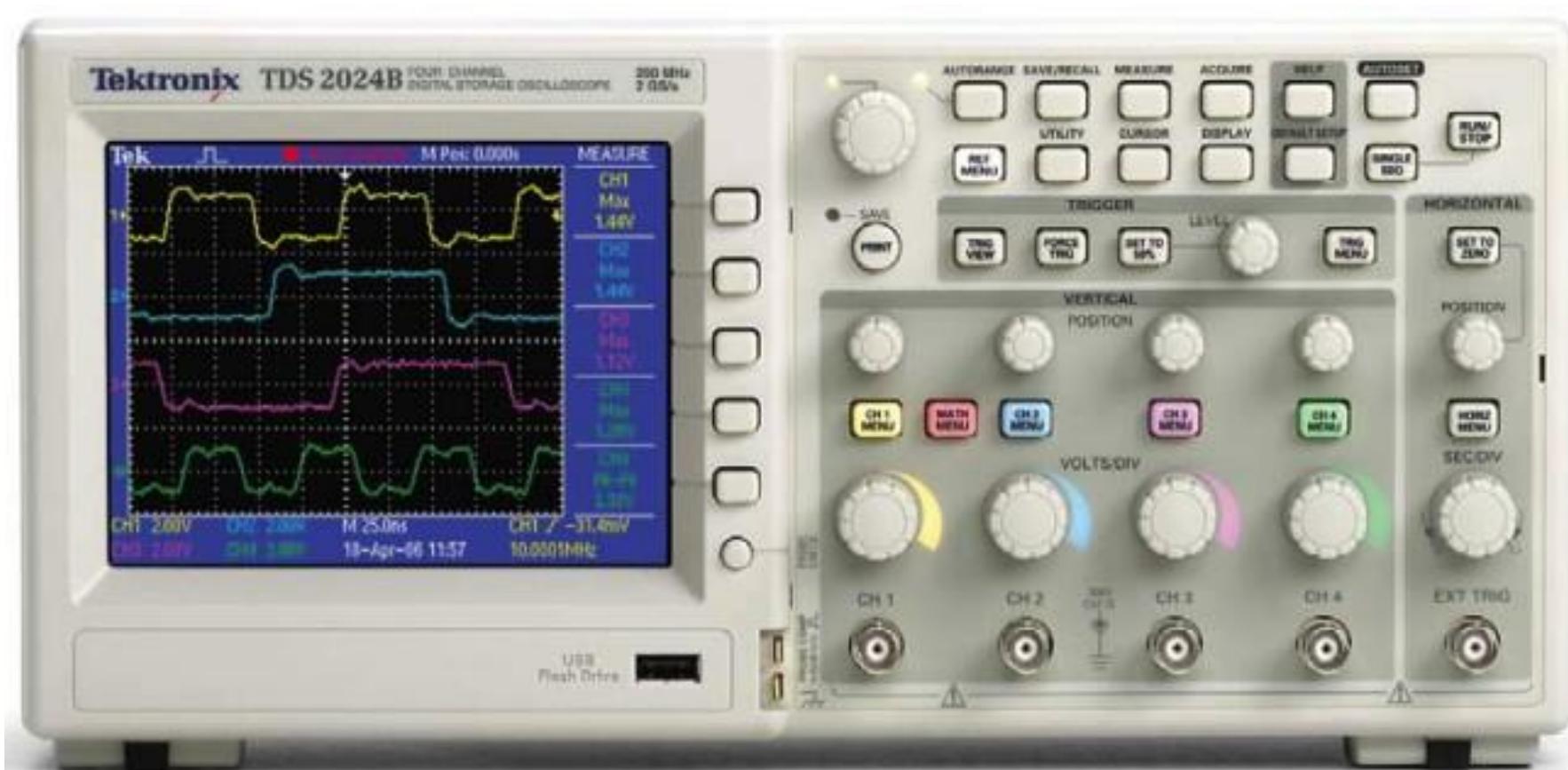
Valor eficaz

A senóide, valor eficaz:

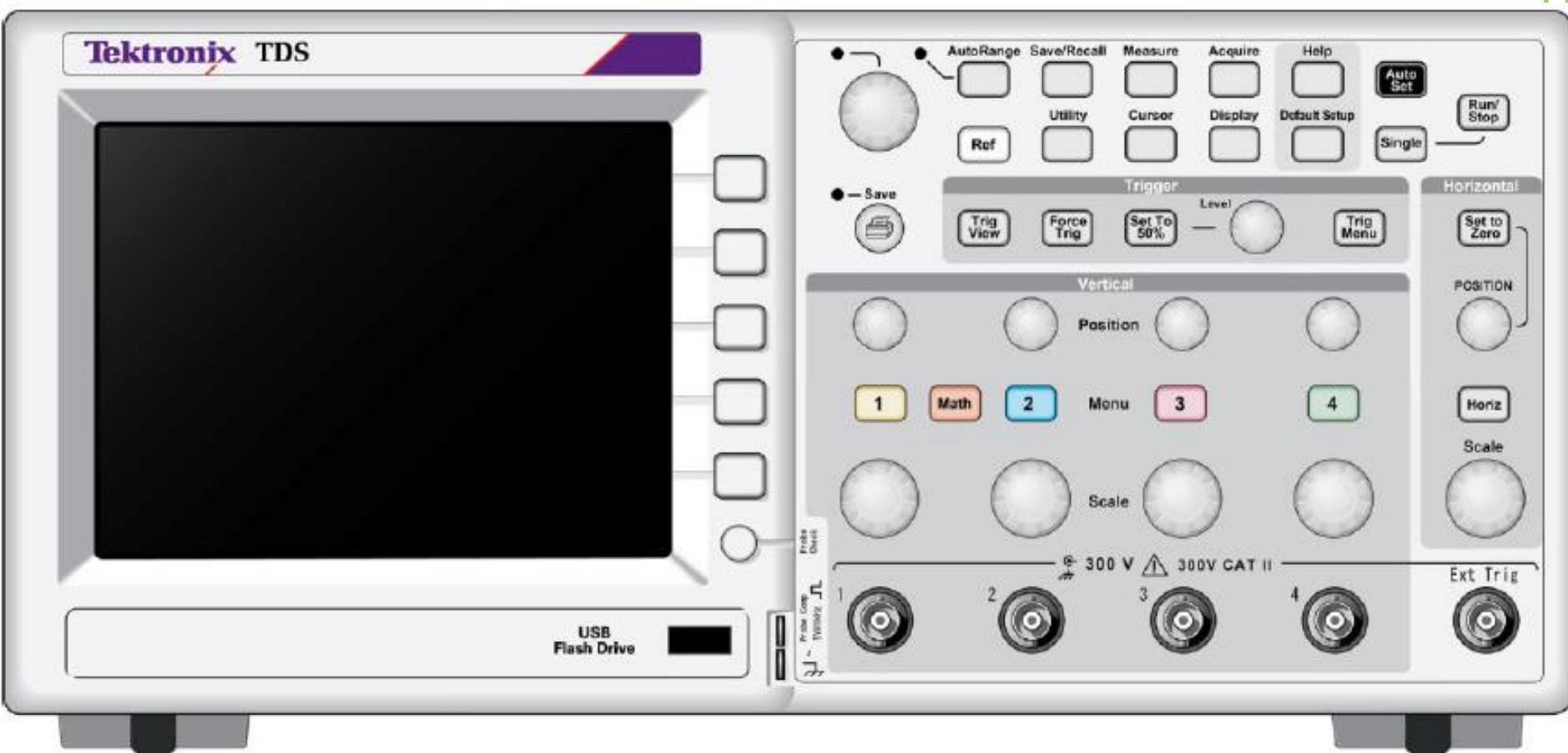


$$V_{rms} = \sqrt{V_{cc}^2 + V_{ca(rms)}^2}$$

Aula Prática:



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