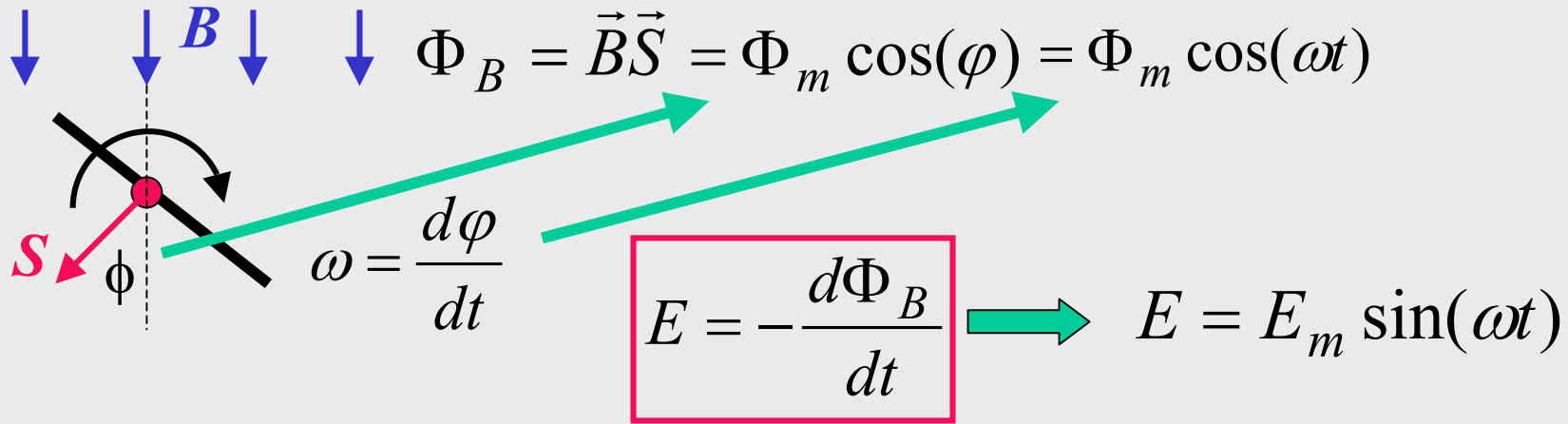
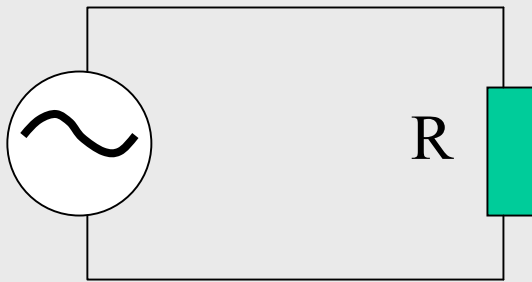


Vahelduvvool

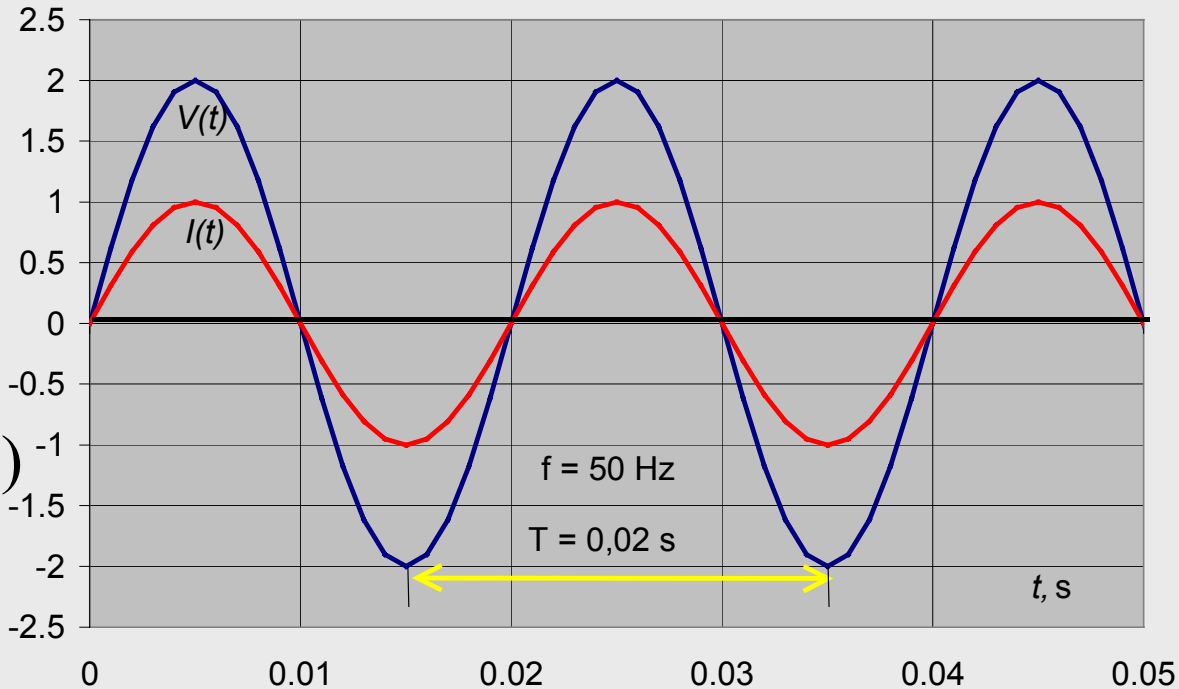


$$E = V_R = V_m \sin(\omega t)$$

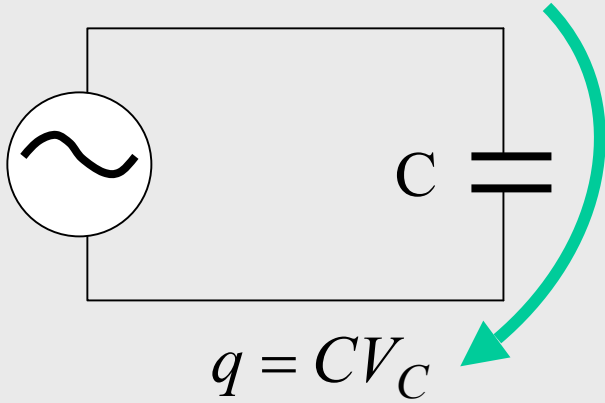


Ohmi seadus:

$$I_R = \frac{V_R}{R} \sin(\omega t) = I_m \sin(\omega t)$$



$$E = V_C = V_m \sin(\omega t)$$



$$q = CV_C$$

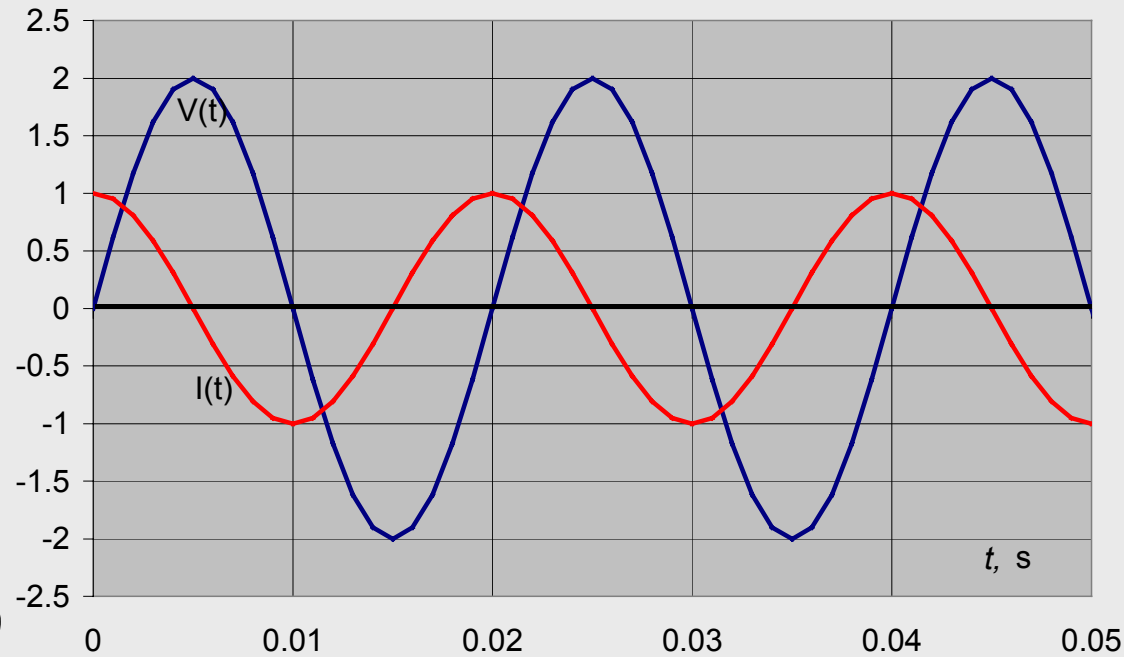
$$I_C = \frac{dq}{dt} = \omega C V_m \cos(\omega t)$$

Anal. Ohmi seadusega:

$$I_C = \frac{V_m}{X_C} \cos(\omega t) = I_m \cos(\omega t)$$

Mahtuvuslik takistus:

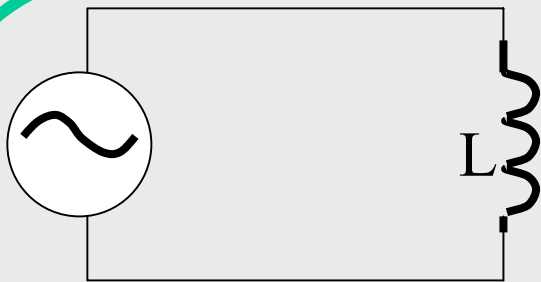
$$X_C = \frac{1}{\omega C}$$



Pinge ja voolu vahel on faasivahe:

vool on **pingest** ees

$$E = V_L = V_m \sin(\omega t)$$

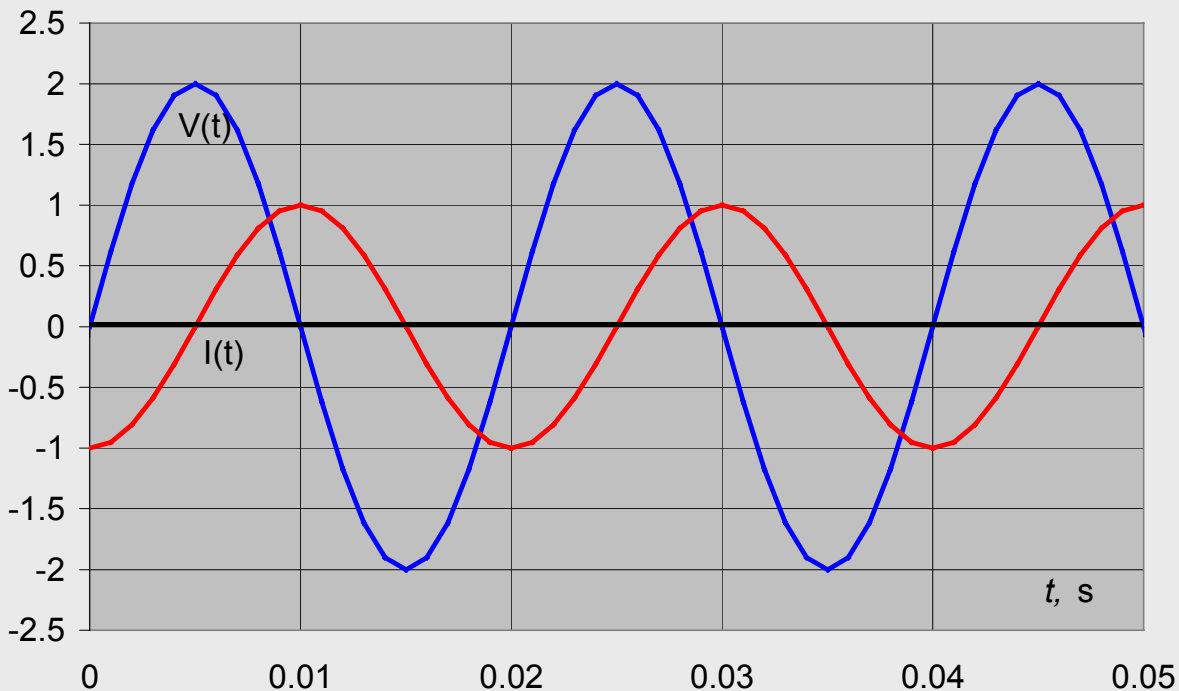


$$V_L = L \frac{dI}{dt}$$

$$\frac{dI}{dt} = \frac{1}{L} V_m \sin(\omega t)$$

$$\int dI = \frac{V_m}{L} \int \sin(\omega t) dt$$

$$I = -\frac{V_m}{\omega L} \cos(\omega t)$$

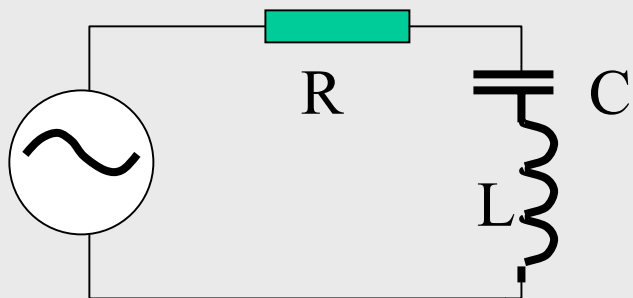


Pinge ja voolu vahel on faasivahe:

vool jääb **pingest** **maha**

Induktiivne takistus:

$$X_L = \omega L$$



Amplituudväärtuste jaoks:

$$I_m = \frac{V_m}{Z}$$

Kogutakistus e. impedants: $Z = \sqrt{R^2 + (\omega L - 1/\omega C)^2}$

$$R = 10 \, \Omega$$

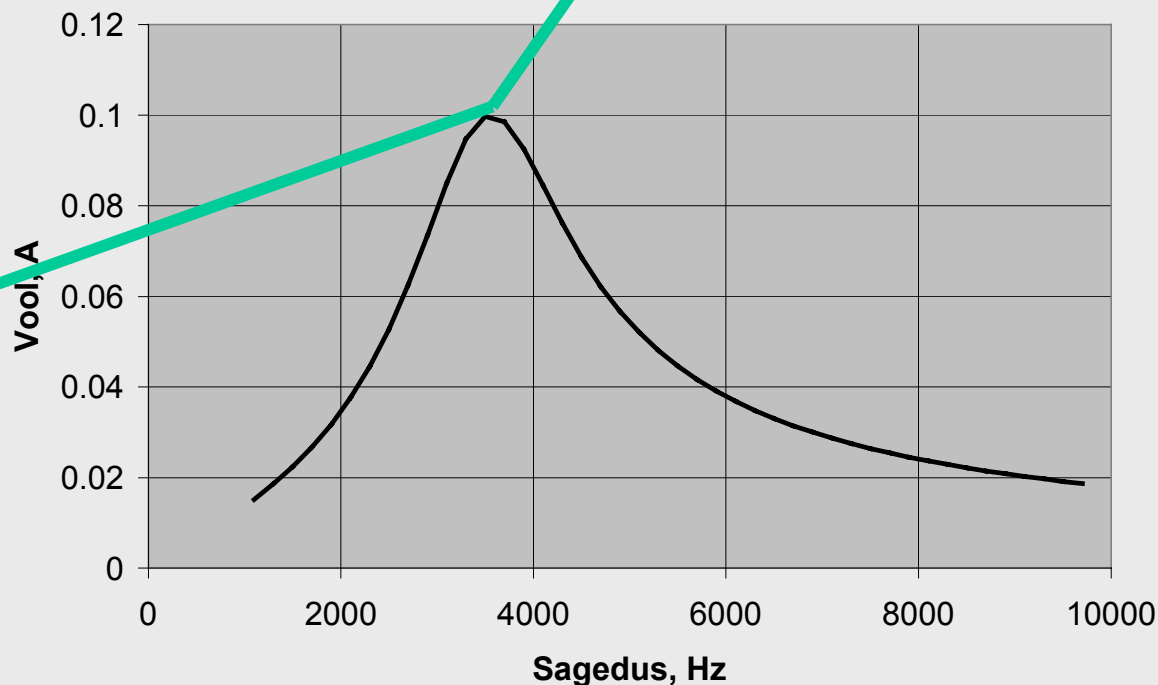
$$C = 2 \times 10^{-6} \, \text{F}$$

$$L = 10^{-3} \, \text{H}$$

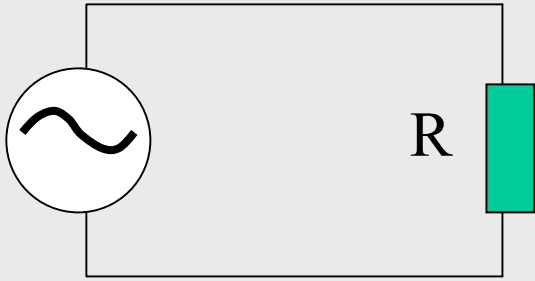
$$V_m = 1 \, \text{V}$$

Resonants

$$\omega_0 = \frac{1}{\sqrt{LC}}$$



Võimsus vahelduvvoolu ahelas



$$P = IV = I^2 R = V^2 / R$$

$$P(t) = I_m^2 R \sin^2(\omega t)$$

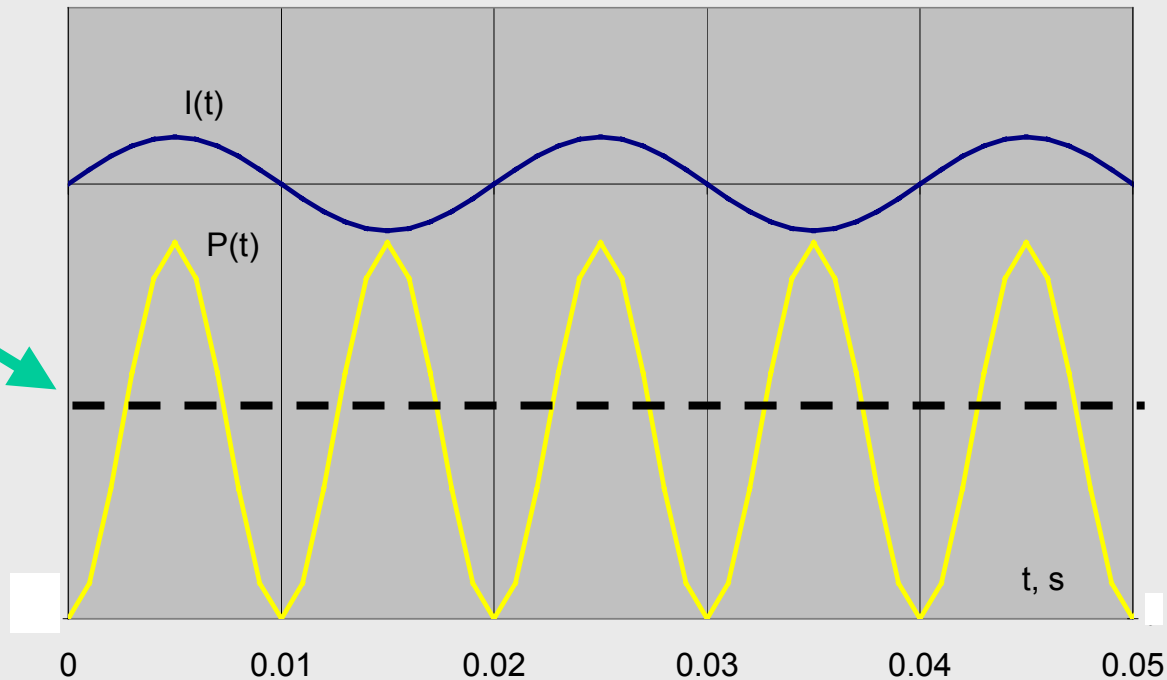
Keskmine võimsus

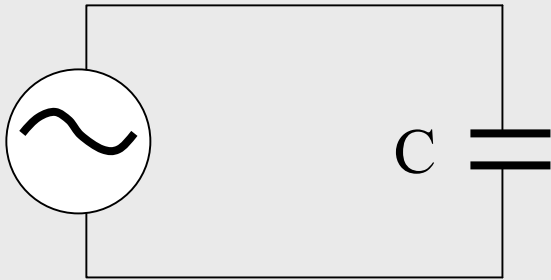
$$P_k = \frac{I_m^2 R}{2}$$

$$P_k = \left(\frac{I_m}{\sqrt{2}} \right)^2 R$$

$$I_{ef} = \frac{I_m}{\sqrt{2}}$$

$$V_{ef} = \frac{V_m}{\sqrt{2}}$$





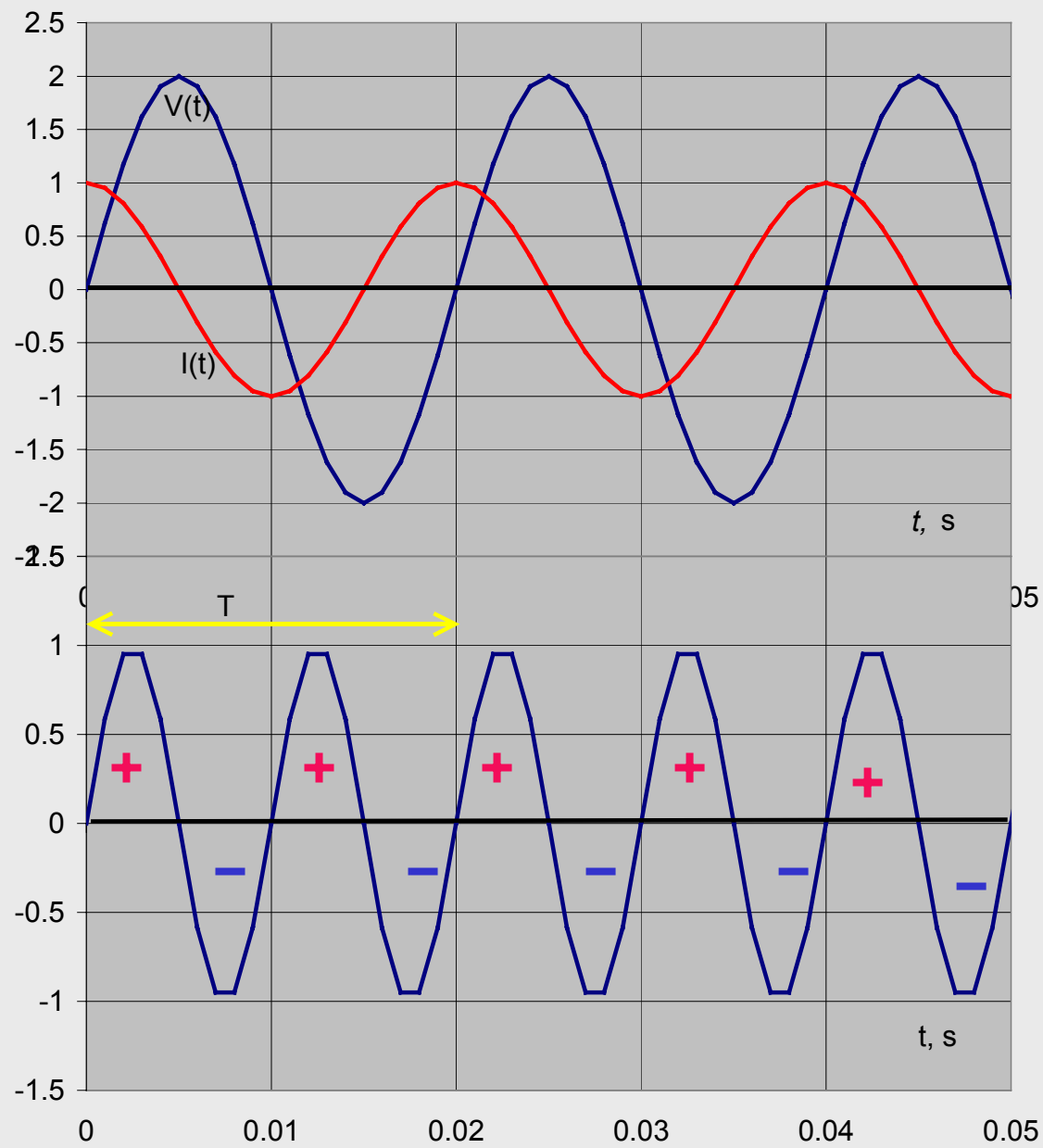
$$V_C = V_m \sin(\omega t)$$

$$I_C = I_m \cos(\omega t)$$

$$P_C = I_C V_C =$$

$$= I_m V_m \cos(\omega t) \sin(\omega t)$$

$$P_k = 0$$



Kondensaator ja induktiivsus ei tarbi energiat