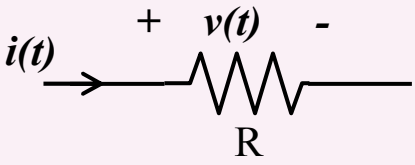
8. Alternatif Akımda (AC) (Sinüzoidal Sürekli Durum) Devre Elemanları

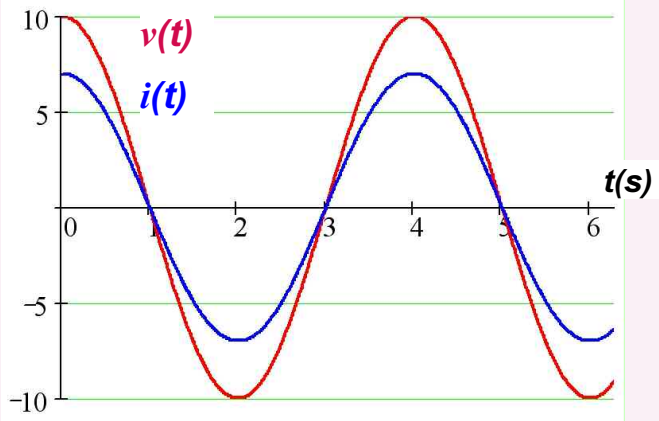
Direnç, R



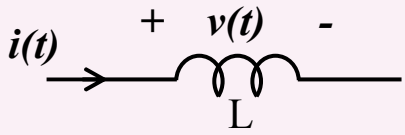
$$i(t) = Im \cdot \cos(\omega \cdot t) \Rightarrow v(t) = R \cdot Im \cdot \cos(\omega \cdot t)$$

$$v(t) = Vm \cdot \cos(\omega \cdot t) \Rightarrow i(t) = \frac{Vm}{R} \cdot \cos(\omega \cdot t)$$

Direnç, R



Endüktans



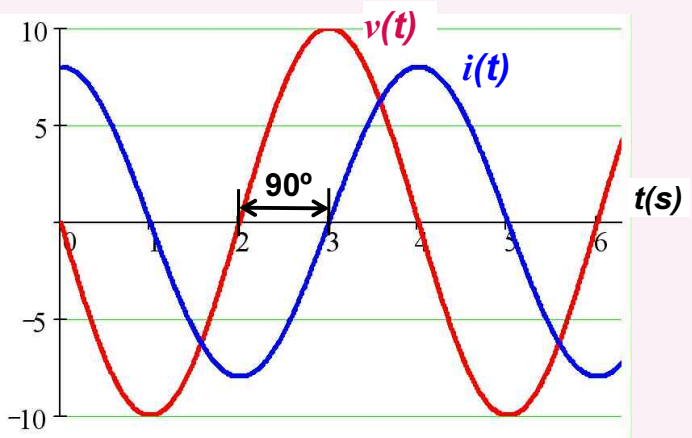
$$v = L\frac{di}{dt}$$

$$i(t) = Im\cdot\cos(\omega\cdot t) \Rightarrow v(t) = \omega\cdot L\cdot Im\cdot\cos(\omega\cdot t + 90^\circ)$$

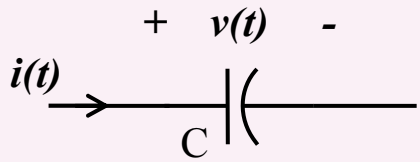
$$v(t) = Vm\cdot\cos(\omega\cdot t) \Rightarrow i(t) = \frac{Vm}{\omega\cdot L}\cdot\cos(\omega\cdot t - 90^\circ)$$

Endüktif reaktans $X_L = \omega\cdot L = 2\cdot\pi f\cdot L$

Endüktans, L



Kapasite



$$i = C\frac{dv}{dt}$$

$$i(t) = I_m \cdot cos(\omega \cdot t) \Rightarrow v(t) = \frac{I_m}{\omega \cdot C} \cdot cos(\omega \cdot t - 90^\circ)$$

$$v(t) = V_m \cdot cos(\omega \cdot t) \Rightarrow i(t) = \omega \cdot C \cdot V_m \cdot cos(\omega \cdot t + 90^\circ)$$

Kapasitif reaktans $X_C = \frac{1}{\omega \cdot C} = \frac{1}{2 \cdot \pi \cdot f \cdot C}$

Kapasite, C