ARUS BOLAK-BALIK

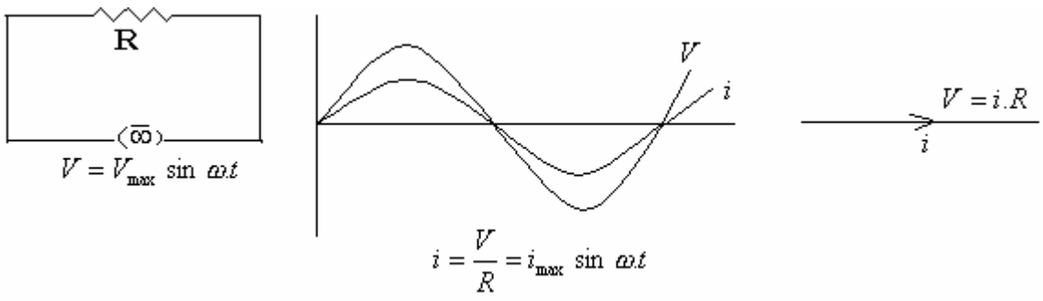
Osiloskop = mengukur tegangan max
$E=E_{max}$. Sin ω.t
$E_{efektif}$ = yang diukur oleh voltmeter
E_{max} = yang belum terukur
E_{pp} = dari puncak ke puncak
ω = frekwensi anguler
t = waktu
V_{max} = tegangan maksimum
I_{max} = Arus maksimum
T = periode

$$E_{efektif}=\frac{V\,max}{\sqrt{2}}$$

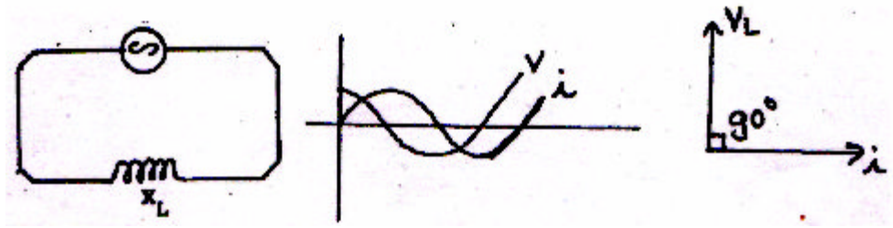
$$I_{efektif}=\frac{i\,max}{\sqrt{2}} \quad \rightarrow \quad I_{efektif} = I_{max}\{\sqrt{\frac{1}{T}\int_0^T \sin^2(\frac{2\pi}{T})dt}\ \}$$

$E_{pp} = 2.E_{max}$

I. Resistor pada DC-AC



II. Induktor (L) pada DC-AC



Xl = reaktansi induktif

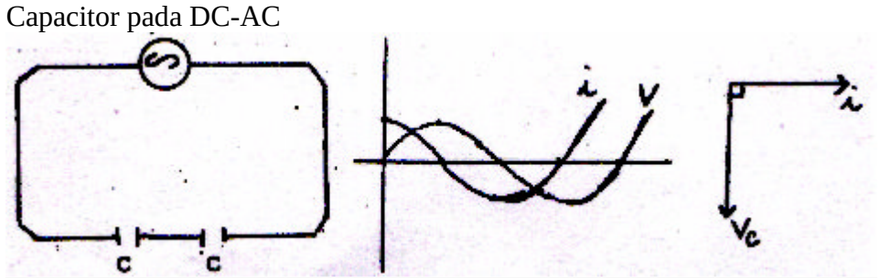
$$E = L\frac{\dim ax.\sin \varpi.t}{dt}$$

$$E = L.\varpi.i\max.\cos \varpi.t$$

$$Xl = \varpi.L$$

(satuan X_L = ohm)

III. Capacitor pada DC-AC



C = kapasitas kapasitor

Q=C.V

Xc = reaktansi kapasitif

$$i = \frac{dQ}{dt} = \frac{dc.V}{dt}$$

$$i = \frac{c.dV\max.\sin\varpi.t}{dt}$$

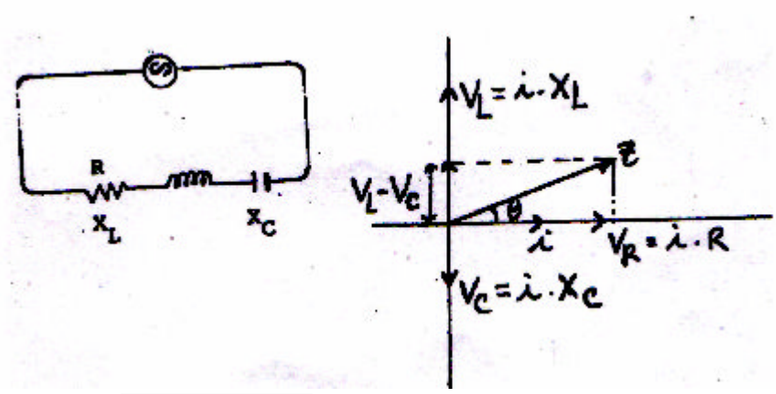
$$i = \varpi.c.V\max.\cos\varpi.t$$

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

(Satuan X_C = 0hm)

IV. R-L-C dirangkai seri

1. $.Xl = \varpi.L$
2. $Xc = \frac{1}{\varpi.C}$
3. Gambar fasor



4. $Z = \sqrt{R^2 + (Xl - Xc)^2}$
5. $i = \frac{E}{Z}$
6. $Vab = i.R$ $\quad Vac = \sqrt{Vr^2 + Vl^2}$
   $Vbc = i.Xl$ $\quad Vbd = Vl - Vc$
   $Vcd = i.Xc$ $\quad Vad = \sqrt{Vr^2 + (Vl - Vc)^2}$
7. Daya=Psemu.cos θ
   Daya=Psemu. $\frac{R}{Z}$
   Psemu = V.I (Volt Amper)
   a. $Xl > Xc \rightarrow$ RLC bersifat induktif
      V mendahului I dengan beda fase θ
   b. $Xl = Xc \rightarrow$ RLC resonansi
      Z = R → kuat arus paling besar, karena hambatan total paling kecil.

$$f = \frac{1}{2\pi}\sqrt{\frac{1}{L.C}} \qquad T = 2\pi\sqrt{L.C}$$

   c. $Xc > Xl \rightarrow$ RLC bersifat capasitif
      I mendahului V dengan beda fase θ

8. tg θ = $\frac{XL - XC}{R}$

Z = Impedansi
θ = sudut fase
L = induktansi diri
f = frekwensi
T = periode
R = hambatan