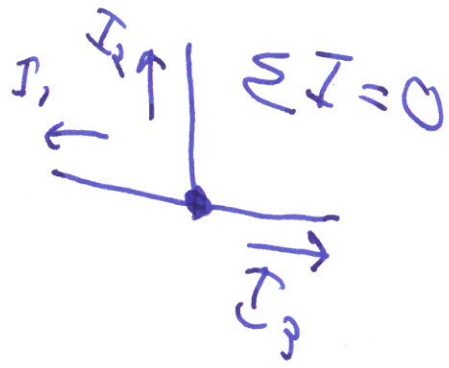
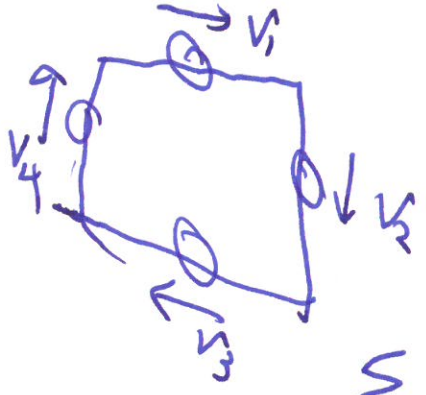
KCL



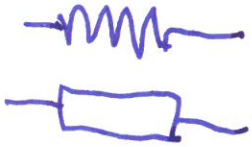
$$\Sigma I = 0$$

KVL



$$\Sigma V = 0$$

Components

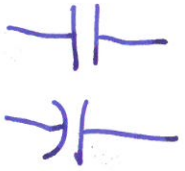


R

$V = IR$

$I = GV$

G = Conductance $= \frac{1}{R}$



C

$q = CV$

charge

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

Time Domain

Negative

$X_c = \frac{1}{j\omega C}$

Frequency Domain

L

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

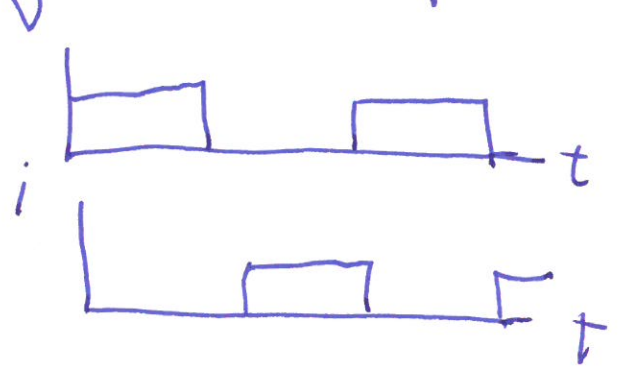
$X_L = j\omega L$

$P = iV$ Instantaneous

Energy

$$W = \int_0^T P\,dt$$

$$P_{AV} = \frac{W}{T}$$ eg / cycle



$P_{AV} = 0$

In Resistor

$$P = \frac{V^2}{R} = i^2 R$$

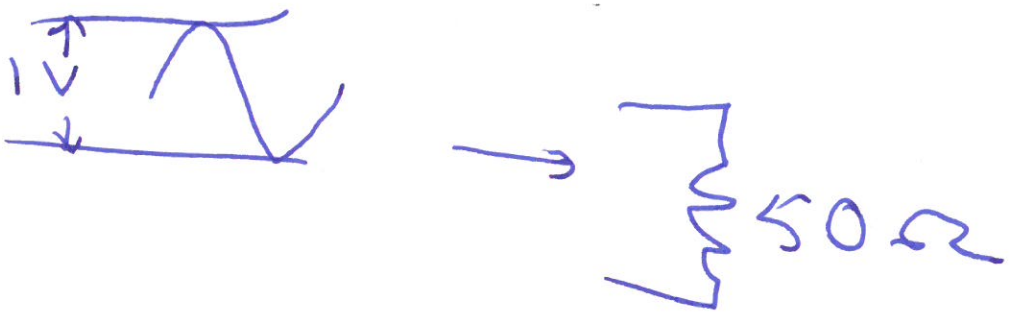
RMS voltage (Sinusoid) $V_{RMS} = \frac{1}{\sqrt{2}} V_{PK}$

Ratios

$$20 \log_{10} \left(\frac{V}{V_{Ref}} \right)$$

Power Ratio in dB $= 10 \log_{10} \left(\frac{P}{P_{Ref}} \right)$

$$dBm = 10 \log_{10} \left(\frac{P}{1mW} \right)$$



How many dBm ?