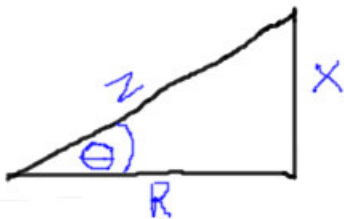
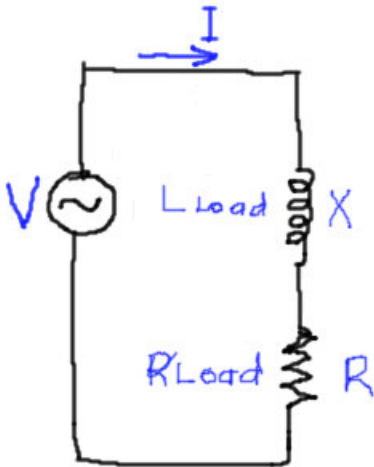
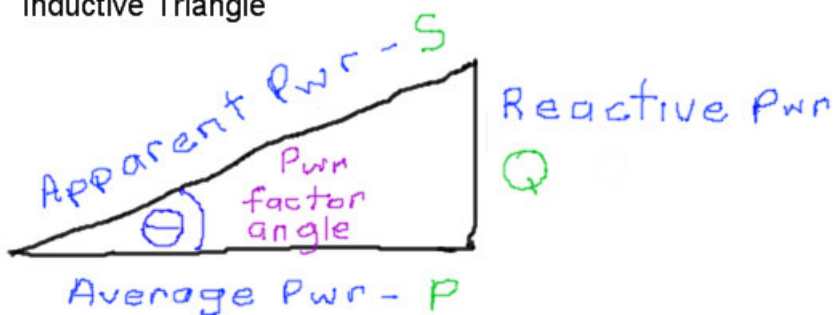


Power Factor Angle



Inductive Triangle



Power Triangle

Power Factor Angle

$$P = I^2 R \quad P = R \times \text{Scaling factor } I^2$$

$$Q = I^2 X \quad Q = X \times \text{Scaling factor } I^2$$

$$S = I^2 Z \quad S = Z \times \text{Scaling factor } I^2$$

Therefore the power triangle is a scaled version of the inductive triangle and they have the same angle θ . That angle is the impedance (Z) angle.

$$Z = \frac{V}{I} = \frac{Vm \angle \phi_v}{Im \angle \phi_i} = \frac{Vm}{Im} \angle (\phi_v - \phi_i)$$

$Z = \frac{Vm}{Im} \angle (\phi_v - \phi_i) \rightarrow Z$'s phase angle $(\phi_v - \phi_i) = \theta$ which is the power factor angle.

$$\cos(\phi_v - \phi_i) = \text{Power factor} \rightarrow \frac{P \text{ (average power)}}{S \text{ (apparent power)}}$$