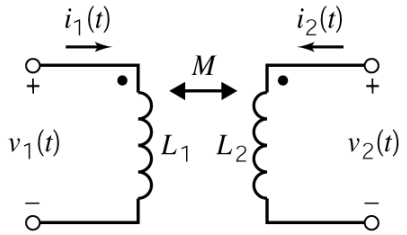
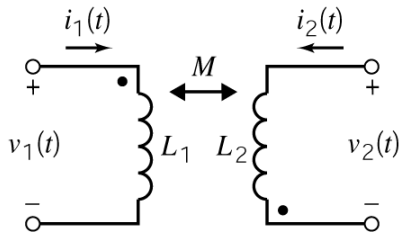
QUANTITY	RELATIONSHIP USING PEAK VALUES	RELATIONSHIP USING rms VALUES	UNITS
Element voltage, $v(t)$	$v(t) = V_m \cos(\omega t + \theta_v)$	$v(t) = V_{rms}\sqrt{2}\cos(\omega t + \theta_V)$	V
Element current, $i(t)$	$i(t) = I_m \cos(\omega t + \theta_I)$	$i(t) = V_{rms}\sqrt{2}\cos(\omega t + \theta_I)$	A
Complex power, $\mathbf{S}$	$\mathbf{S} = \frac{V_m I_m}{2}\cos(\theta_V - \theta_I) + j\frac{V_m I_m}{2}\sin(\theta_V - \theta_I)$	$\mathbf{S} = V_{rms}I_{rms}\cos(\theta_V - \theta_I) + jV_{rms}I_{rms}\sin(\theta_V - \theta_I)$	VA
Apparent power, $\lvert\mathbf{S}\rvert$	$\lvert\mathbf{S}\rvert = \frac{V_m I_m}{2}$	$\lvert\mathbf{S}\rvert = V_{rms}I_{rms}$	VA
Average power, P	$P = \frac{V_m I_m}{2}\cos(\theta_V - \theta_I)$	$P = V_{rms}I_{rms}\cos(\theta_V - \theta_I)$	W
Reactive power, Q	$Q = \frac{V_m I_m}{2}\sin(\theta_V - \theta_I)$	$Q = V_{rms}I_{rms}\sin(\theta_V - \theta_I)$	VAR



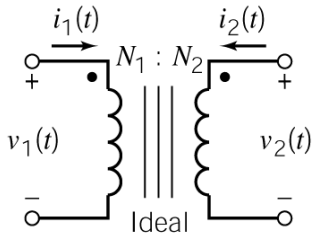
$$v_1 = L_1\frac{di_1}{dt} + M\frac{di_2}{dt} \qquad \mathbf{V}_1 = j\omega L_1\mathbf{I}_1 + j\omega M\mathbf{I}_2$$

$$v_2 = L_2\frac{di_2}{dt} + M\frac{di_1}{dt} \qquad \mathbf{V}_2 = j\omega L_2\mathbf{I}_2 + j\omega M\mathbf{I}_1$$



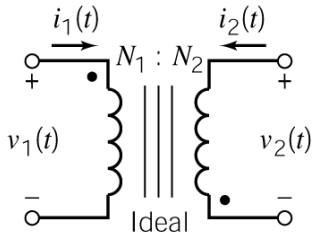
$$v_1 = L_1\frac{di_1}{dt} - M\frac{di_2}{dt} \qquad \mathbf{V}_1 = j\omega L_1\mathbf{I}_1 - j\omega M\mathbf{I}_2$$

$$v_2 = L_2\frac{di_2}{dt} - M\frac{di_1}{dt} \qquad \mathbf{V}_2 = j\omega L_2\mathbf{I}_2 - j\omega M\mathbf{I}_1$$



$$\mathbf{V}_1 = \frac{N_1}{N_2}\mathbf{V}_2$$

$$\mathbf{I}_1 = -\frac{N_2}{N_1}\mathbf{I}_2$$



$$\mathbf{V}_1 = -\frac{N_1}{N_2}\mathbf{V}_2$$

$$\mathbf{I}_1 = \frac{N_2}{N_1}\mathbf{I}_2$$