Phasor Notation

Phasor Circuit Elements

Time Domain   **Phasor Domain**

$+$ $i(t)$ $+$ I

$v(t)$ R V R

$-$ $-$
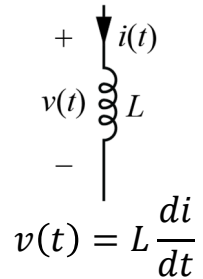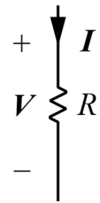
$$v(t) = i(t)R$$

$+$ $i(t)$ $+$ I

$v(t)$ L V $j\omega L$

$-$ $-$

$$v(t) = L\frac{di}{dt}$$

$+$ $i(t)$ $+$ I

$v(t)$ C V $\dfrac{-j}{\omega C}$

$-$ $-$

$$i(t) = C\frac{dv}{dt}$$

Time Domain

$i_1(t)$ $i_2(t)$

$+$ M $+$

$v_1(t)$ L_1 L_2 $v_2(t)$

$-$ $-$
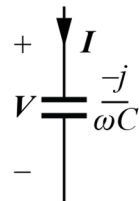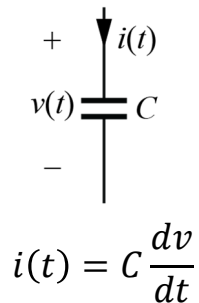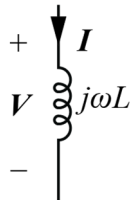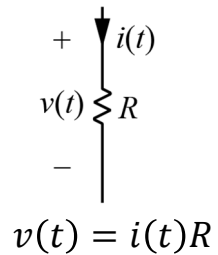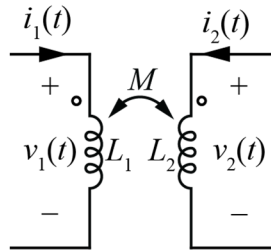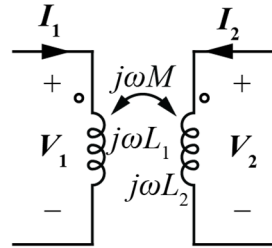
$$v_1(t) = L_1 \frac{di_1}{dt} + M \frac{di_2}{dt}$$

$$v_2(t) = M \frac{di_1}{dt} + L_2 \frac{di_2}{dt}$$

Phasor Domain

I_1 I_2

$+$ $j\omega M$ $+$
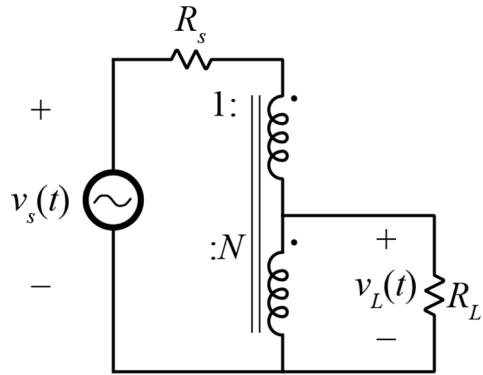
V_1 $j\omega L_1$

$j\omega L_2$ V_2

$-$ $-$

Impedance

Phasor Circuit Analysis

Example Problem

Find $v_L(t)$ for $v_s(t) = 170\cos(2\pi 60 t)$ and for $R_s = 10\ \Omega$, $N = 0.1$, and $R_L = 50\ \Omega$