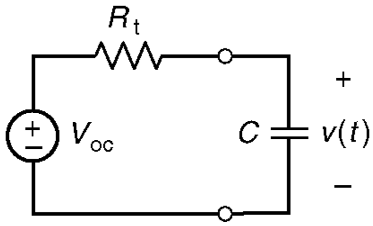
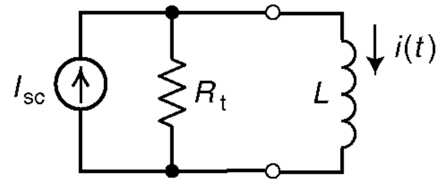
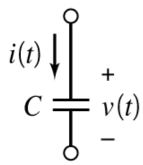
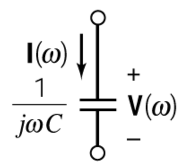
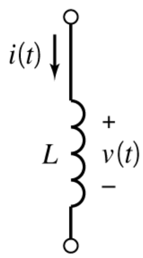
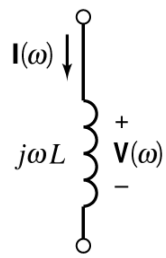
FIRST-ORDER CIRCUIT CONTAINING A CAPACITOR	FIRST-ORDER CIRCUIT CONTAINING AN INDUCTOR
 The capacitor voltage is: $v(t) = V_{oc} + (v(0) - V_{oc})e^{-\frac{t}{\tau}}$ where the time constant is $\tau = R_t C$ and the initial condition, $v(0)$, is the capacitor voltage at time $t = 0$.	 The inductor current is $i(t) = I_{sc} + (i(0) - I_{sc})e^{-\frac{t}{\tau}}$ where the time constant is $\tau = \dfrac{L}{R_t}$ and the initial condition, $i(0)$, is the inductor current at time $t = 0$.

ELEMENT	TIME DOMAIN	FREQUENCY DOMAIN
Capacitor	 $v(t) = \dfrac{1}{C}\int_{-\infty}^{t} i(\tau)\, d\tau$	 $\mathbf{V}(\omega) = \dfrac{1}{j\omega C}\,\mathbf{I}(\omega)$
Inductor	 $v(t) = L\dfrac{d}{dt}i(t)$	 $\mathbf{V}(\omega) = j\omega L\,\mathbf{I}(\omega)$

Complex Numbers

Consider

$$A\angle\theta = a + jb$$

where $A\angle\theta$ is the complex number in polar form and $a + jb$ is the complex number in rectangular form. The conversion from polar form to rectangular form and vice versa is described by

$$a = \text{the real part of } A\angle\theta = A\cos(\theta)$$

$$b = \text{the imaginary part of } A\angle\theta = A\sin(\theta)$$

$$A = \text{the magnitude of } a + jb = \sqrt{a^2 + b^2}$$

$$\theta = \text{the angle of } a + jb = \begin{cases} \tan^{-1}\left(\dfrac{b}{a}\right) & \text{when} \quad a > 0 \\ 180° - \tan^{-1}\left(\dfrac{b}{-a}\right) & \text{when} \quad a < 0 \end{cases}$$