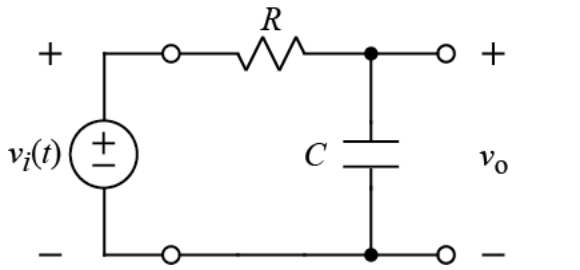
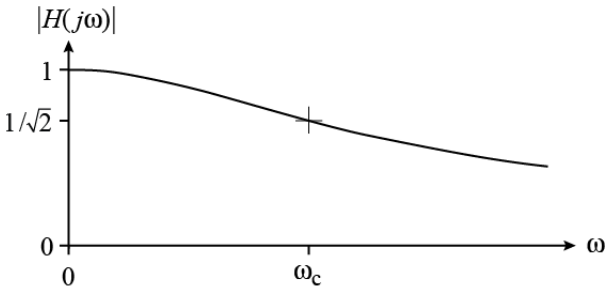
TOOL: The *RC* and *RL* circuits shown below act as one-pole low-pass filters.

RC cutoff frequency: $\omega_c = \dfrac{1}{RC}$

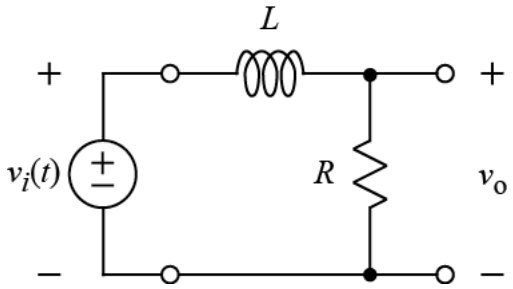


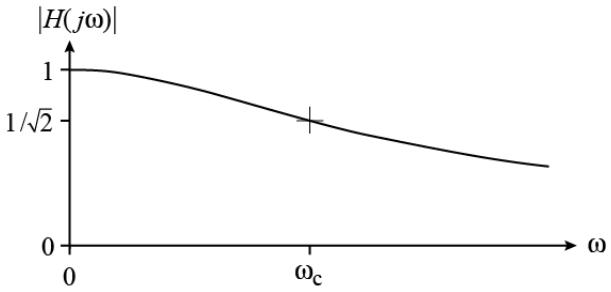


$$H(j\omega) = \frac{\dfrac{1}{j\omega C}}{R + \dfrac{1}{j\omega C}} = \frac{1}{1 + j\omega RC}$$

Fig. 1. *RC* low-pass filter.

RL cutoff frequency: $\omega_c = \dfrac{R}{L}$



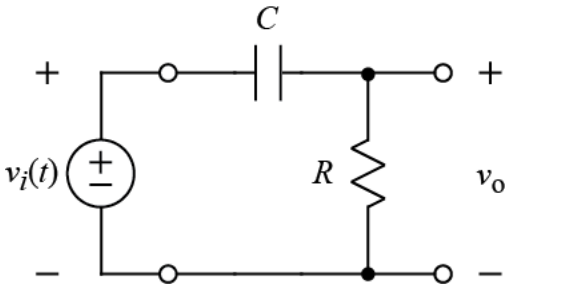


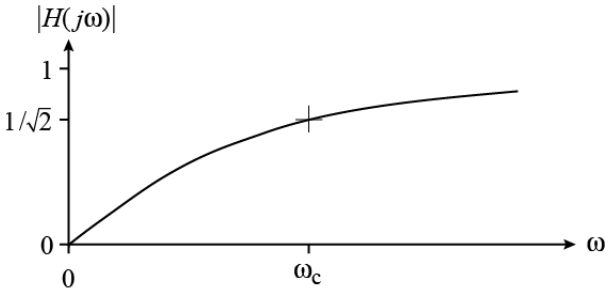
$$H(j\omega) = \frac{R}{R + j\omega L} = \frac{1}{1 + j\omega \dfrac{L}{R}}$$

Fig. 2. *RL* low-pass filter.

TOOL: The *RC* and *RL* circuits shown below act as one-pole high-pass filters.

RC cutoff frequency: $\omega_c = \dfrac{1}{RC}$

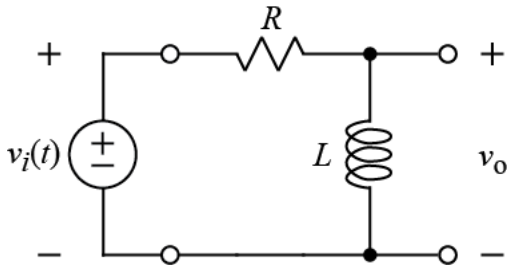


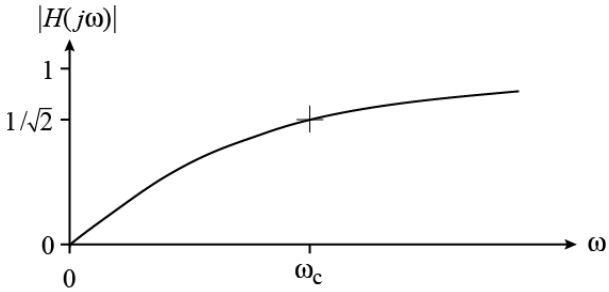


$$H(j\omega) = \frac{R}{R + \dfrac{1}{j\omega C}} = \frac{1}{1 + \dfrac{1}{j\omega RC}}$$

Fig. 1. *RC* high-pass filter.

RL cutoff frequency: $\omega_c = \dfrac{R}{L}$





$$H(j\omega) = \frac{j\omega L}{R + j\omega L} = \frac{1}{1 + \dfrac{R}{j\omega L}}$$

Fig. 2. *RL* high-pass filter.