

Frequency response of networks.

Next, an expression for the load voltage V_L may be found by connecting the load to the Thevenin equivalent source circuit and by computing the result of a simple voltage divider.

$$V_L = \frac{Z_L}{Z_L + Z_T} V_T$$

$$= \frac{Z_L}{Z_L + (Z_S + Z_1)Z_2 / (Z_S + Z_1 + Z_2)} \frac{Z_2}{Z_S + Z_1 + Z_2} V_S$$

$$= \frac{Z_L Z_2}{Z_L(Z_S + Z_1 + Z_2) + (Z_S + Z_1)Z_2}$$

High-Pass Filters

Just as you can construct a simple filter that preserves low frequencies and attenuates higher frequencies. You can easily construct a high-pass filter that passes mainly those frequencies above a certain cut-off frequency. Consider the circuit shown in . The frequency response for the high-pass filter

$$H(j\omega) = \frac{V_o}{V_i}(j\omega)$$

May be obtained by noting that

$$V_o(j\omega) = V_i(j\omega) \frac{R}{R + 1/j\omega C} = V_i(j\omega) \frac{j\omega CR}{1 + j\omega CR}$$