Bandpass filter transfer function

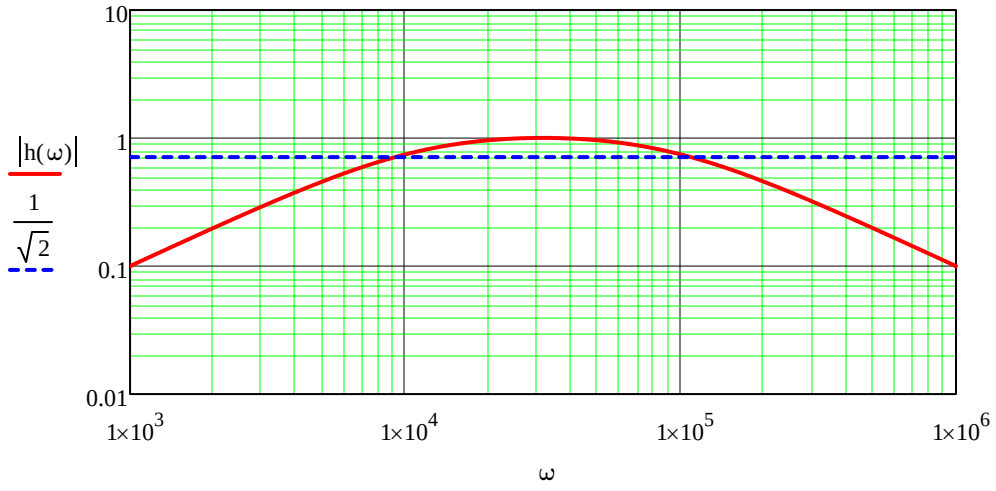
$R := 10 \qquad L := 0.001 \qquad C := 1 \cdot 10^{-6}$

$\omega_0 := \frac{1}{\sqrt{L \cdot C}} = 3.162 \times 10^{4} \qquad \tau := R \cdot C = 1 \times 10^{-5} \qquad Q := \omega_0 \cdot \tau = 0.316$

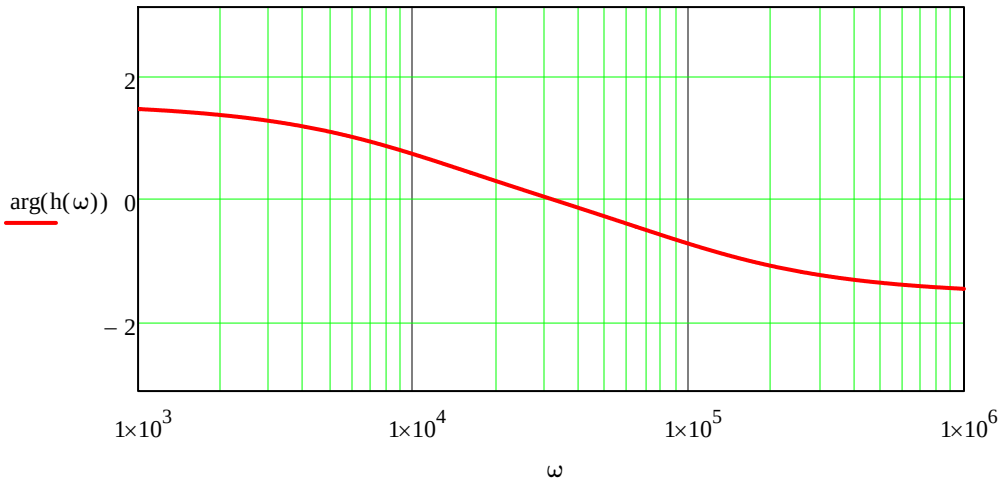
$$h(\omega) := \frac{\frac{\omega}{\omega_0}}{\frac{\omega}{\omega_0} - i \cdot Q \cdot \left[1 - \left(\frac{\omega}{\omega_0}\right)^2\right]}$$

Complex ratio of output voltage to input voltage

Magnitude of Bandpass Filter Transfer Function



Phase of Bandpass Filter Transfer Function



$Q = 0.316$ Prediction for the quality factor Q

$f(x) := \left|h(x)\right| - \frac{1}{\sqrt{2}}$ Numerical calculation of Q

$\omega_1 := \text{root}\left(f(x), x, 0, \omega_0\right) = 9.161 \times 10^3$

$\omega_2 := \text{root}\left(f(x), x, \omega_0, 4\omega_0\right) = 1.092 \times 10^5$

$\frac{\omega_0}{\omega_2 - \omega_1} = 0.316$ Definition of the Q factor