Three Pole Butterworth Filter

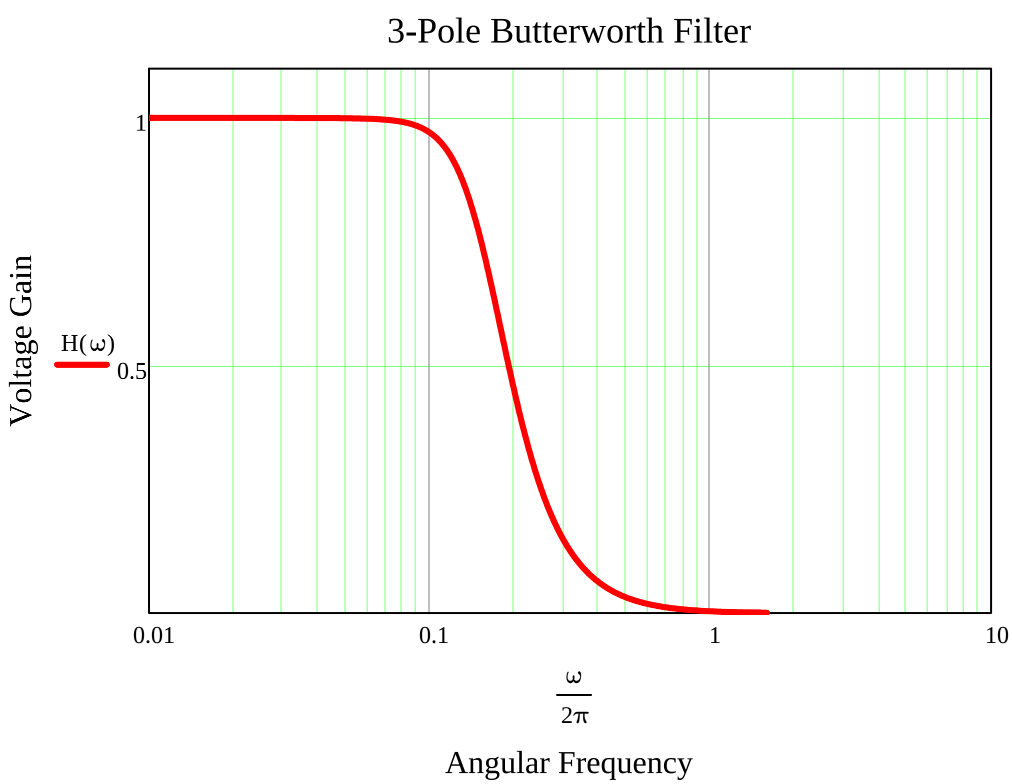
$L_1 := \frac{3}{2}$ $\quad L_3 := \frac{1}{2}$ $\quad R := 1$ $\quad C := \frac{4}{3}$

$$Z(\omega) := \begin{bmatrix} i\cdot\left(\omega\cdot L_1 - \frac{1}{\omega\cdot C}\right) & \frac{-1}{i\cdot\omega\cdot C} \\ \frac{-1}{i\cdot\omega\cdot C} & R + i\cdot\left(\omega\cdot L_3 - \frac{1}{\omega\cdot C}\right) \end{bmatrix} \qquad V := \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$I(\omega) := Z(\omega)^{-1}\cdot V$$

$$V_{out}(\omega) := I(\omega)_2\cdot R$$

$$H(\omega) := \left|V_{out}(\omega)\right|$$



Plot the response in the complex frequency plane

$F(x,y) := H(x + i \cdot y)$

3-pole Butterworth filter response vs complex frequency

F

Note the locations of the 3 "poles", where there are zeroes in the complex impedance.