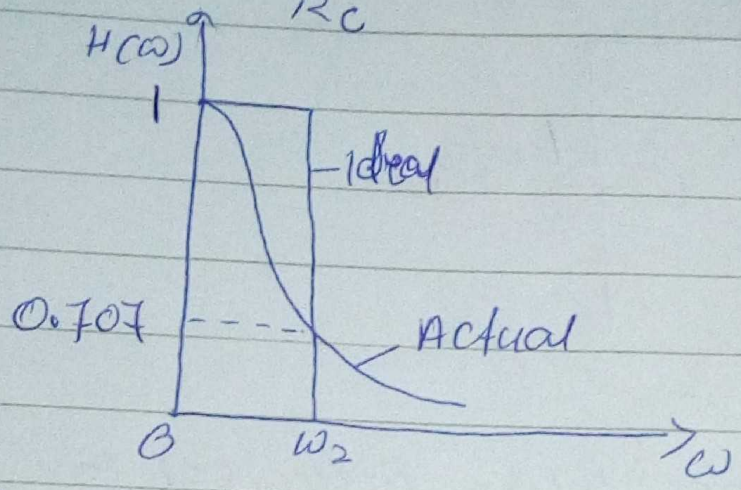
Magnitude of $H(\omega)$ to $1/\sqrt{2}$ thus

$$H(\omega) = \frac{1}{\sqrt{1+\omega_2^2 R^2 C^2}} = \frac{1}{\sqrt{2}}$$

$$\omega_c = \frac{1}{RC}$$



Ideal and actual frequency response of low pass filter

The Cut-off frequency is also called the roll of frequency.

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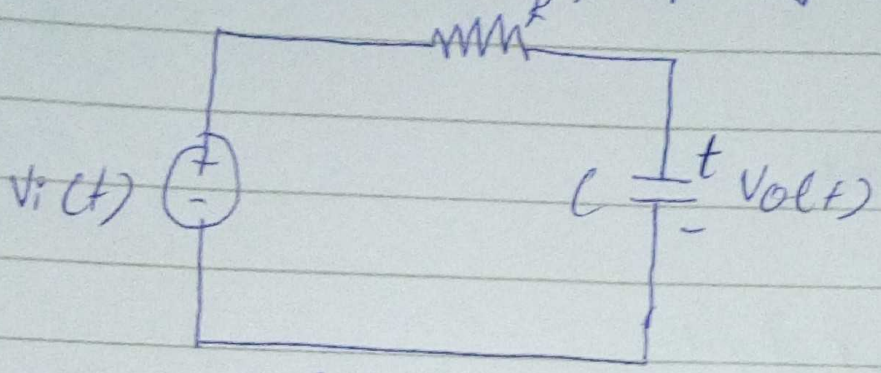
Determine the type of filter shown below and show that its cut-off frequency is: $\omega_c = 1/RC$



Solution

This is a low-pass filter. A typical low pass filter is formed when the output of an RC circuit is taken off the capacitor

The transfer function is

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

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

Note that $H(0) = 1$, $H(\infty) = 0$

The half power frequency which is equivalent to the corner frequency on the bode plots but in the context of filters is usually known as the cut off frequency ω_c is obtained by setting the