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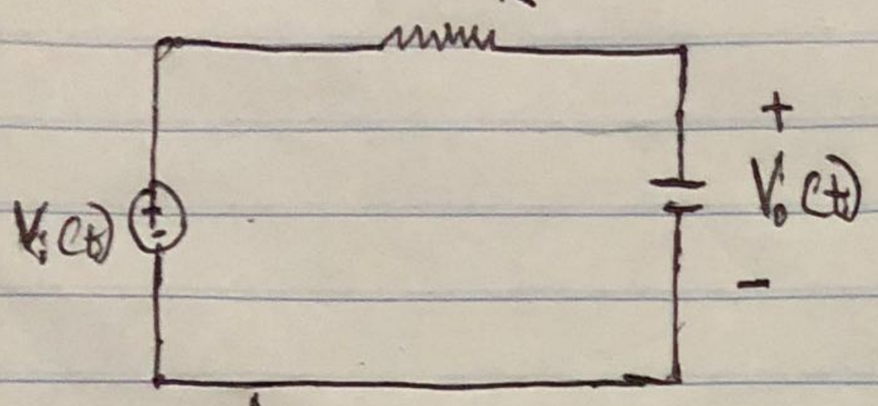
MATNO: 17/ENG04/1006
DEPT: ELECT/ELECT

i Determine the type of filter shown below and show that the Cut off frequency is $W_c = 1/Rc$



Answer

It is a low pass filter, and it is formed when the output of an Rc Circuit is taken off the Capacitor

Transfer function is

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

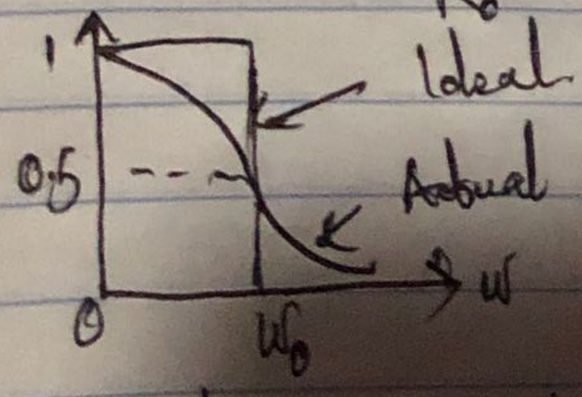
$$H(\omega) = \frac{1}{1 + j\omega Rc}$$

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

The half power frequency which is equivalent to the corner frequency on the Bode plots had in the Contexts of the filters is Usually known as Cut off frequency

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

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



Ideal and actual frequency response of low pass filter.