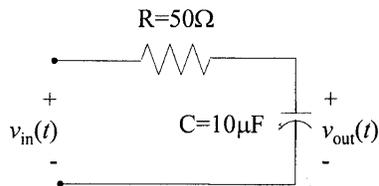


Name: Key

EE322 Fall 2008 Quiz 07

For each of the four circuits below, find the equation for the frequency response $H(f)$ and determine if the filter is a high pass filter or a low pass filter. In your equation for $H(f)$, use algebra to simplify the expression to one numerator and one denominator.



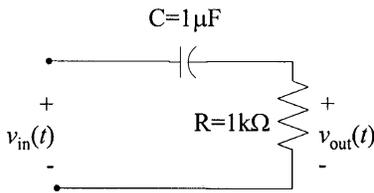
$RC = 500 \times 10^{-6}$

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

$$= \frac{1}{j\omega RC + 1}$$

$H(f) = \frac{1}{j\omega(5 \times 10^{-4}) + 1}$ Type of filter: LPF

$\omega = 0, |H(j\omega)| = 1$
 $\omega = \infty, |H(j\omega)| = 0$



$RC = 1 \times 10^{-3}$

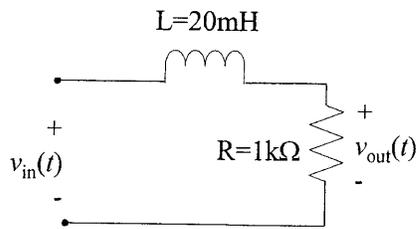
$$H(j\omega) = \frac{R}{R + \frac{1}{j\omega C}}$$

$$= \frac{j\omega RC}{j\omega RC + 1}$$

$H(f) = \frac{j\omega(1 \times 10^{-3})}{j\omega(1 \times 10^{-3}) + 1}$ Type of filter: HPF

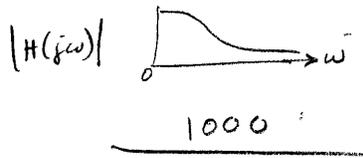


$\omega = 0, |H(j\omega)| = 0$
 $\omega = \infty, |H(j\omega)| = 1$



$$H(j\omega) = \frac{R}{R + j\omega L}$$

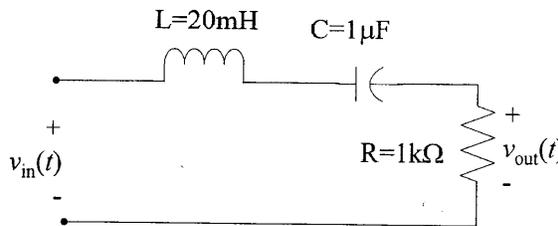
$$= \frac{1000}{1000 + j\omega(.02)}$$



$$\omega = 0, |H(j\omega)| = 1$$

$$\omega = \infty, |H(j\omega)| = 0$$

$$H(f) = \frac{1000}{1000 + j\omega(.02)} \quad \text{Type of filter: } \underline{\text{LPF}}$$



$$H(j\omega) = \frac{R}{j\omega L + R + \frac{1}{j\omega C}} \cdot \frac{(j\omega C)}{(j\omega C)}$$

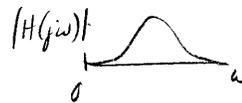
$$= \frac{j\omega RC}{-\omega^2 LC + j\omega RC + 1}$$

$$\omega = 0, |H(j\omega)| = 0$$

$$\omega = \infty, |H(j\omega)| = 0$$

$$RC = 1e-3$$

$$LC = 20e-9$$



$$H(f) = \frac{j\omega(1e-3)}{-\omega^2(20e-9) + j\omega(1e-3) + 1} \quad \text{Type of filter: } \underline{\text{BPF}}$$

Bonus: What is the capital of Mongolia, OR, what is the capital of the United Arab Emirates, OR, what is the capital of Uruguay?

Ulaanbaatar

Montevideo

Abu Dhabi