

Take Home Exam 4 Frequency Response

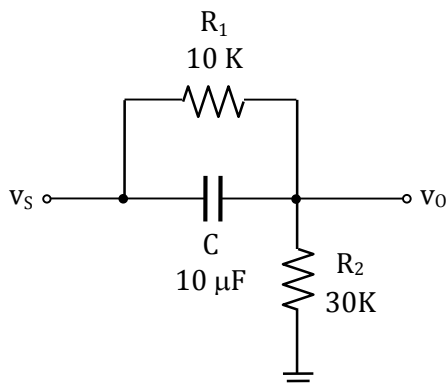
(Use the logarithmic graph paper given on the next page. You can make any number copies you need.)

1) For the two circuits given below,

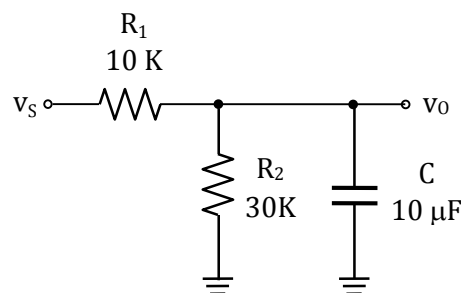
(a) Sketch the Bode magnitude plot

(b) Sketch the Bode phase plot

(c) Determine the frequencies at which the magnitude is $1/\sqrt{2}$ of the peak value of the voltage transfer function.



(a)



(b)

2) (a) Sketch the Bode magnitude plot for the function

$$H(j\omega) = \frac{10 j\omega}{(j\omega + 100)(j\omega + 10000)}$$

(b) What is the mid-band gain in decibels?

(c) Is there a dominant pole? If so, what is the approximate pole frequency?

(d) What is the low corner frequency (-3 dB frequency)?

3) For the circuit given, the parameters are:

$$R_1 = 20 \text{ k}\Omega$$

$$R_2 = 10 \text{ k}\Omega$$

$$R_3 = 10 \text{ k}\Omega$$

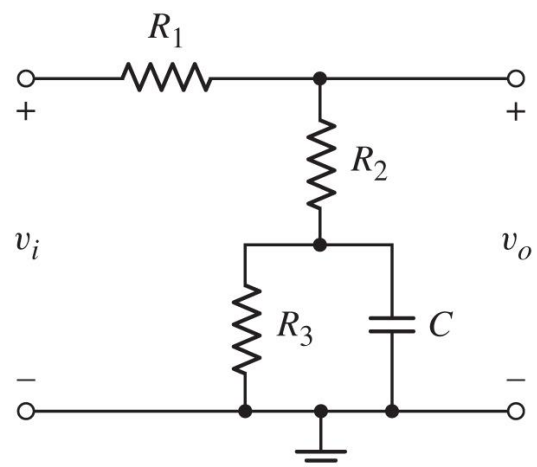
$$C = 10 \text{ }\mu\text{F}$$

Determine and plot

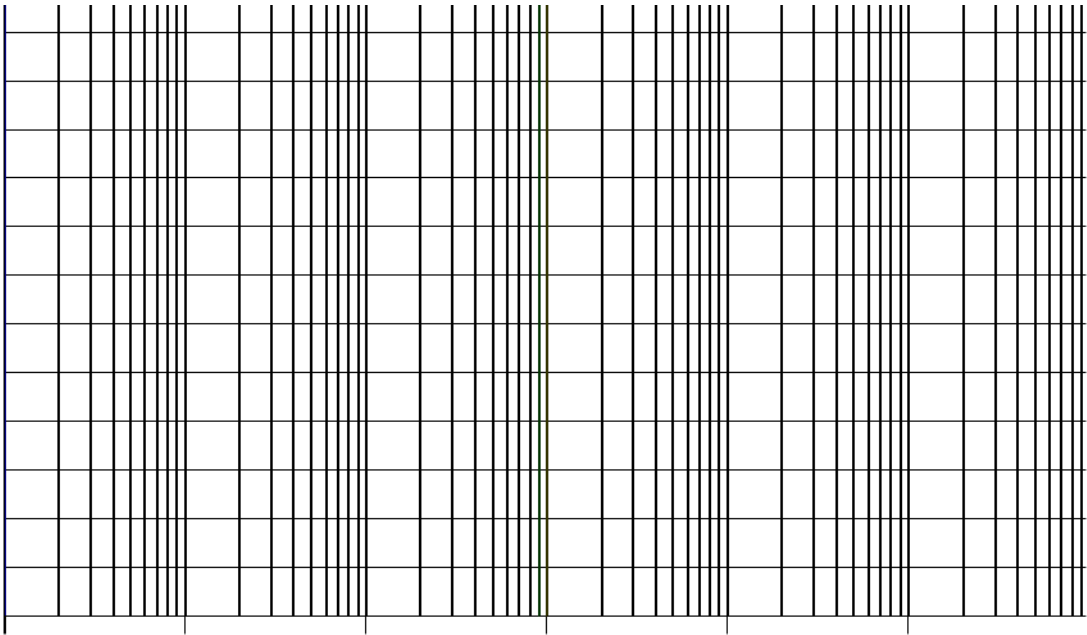
(a) The Bode magnitude plot

(b) The Bode phase plot

(c) Determine the frequencies at which the magnitude is $1/\sqrt{2}$ of the peak value.

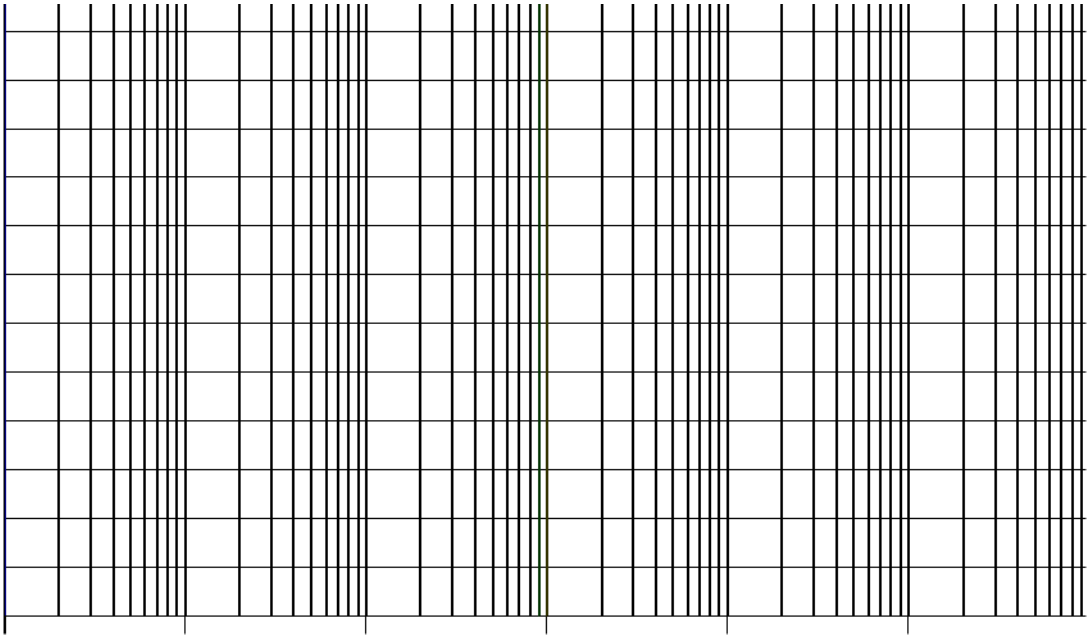


$|H|_{\text{dB}}, \text{ dB}$



$\omega,$
 rad/sec

$\Theta, \text{ rad}$



$\omega,$
 rad/sec