

EE228

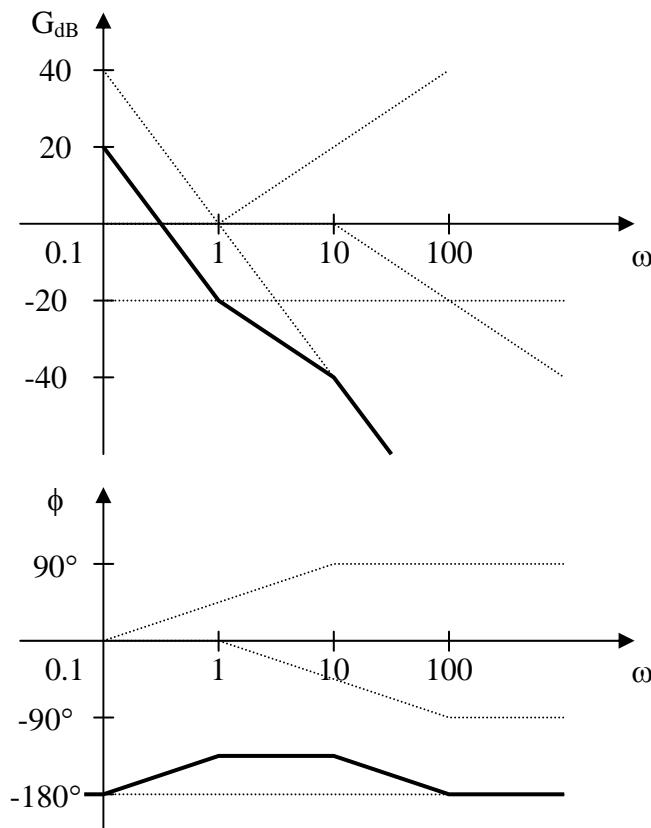
Spring 2007

Problem Set #17**Chapter 14, Solution 13.**

$$G(\omega) = \frac{1 + j\omega}{(j\omega)^2(10 + j\omega)} = \frac{(1/10)(1 + j\omega)}{(j\omega)^2(1 + j\omega/10)}$$

$$G_{dB} = -20 + 20\log_{10}|1 + j\omega| - 40\log_{10}|j\omega| - 20\log_{10}|1 + j\omega/10|$$

$$\phi = -180^\circ + \tan^{-1}\omega - \tan^{-1}\omega/10$$

The magnitude and phase plots are shown below.

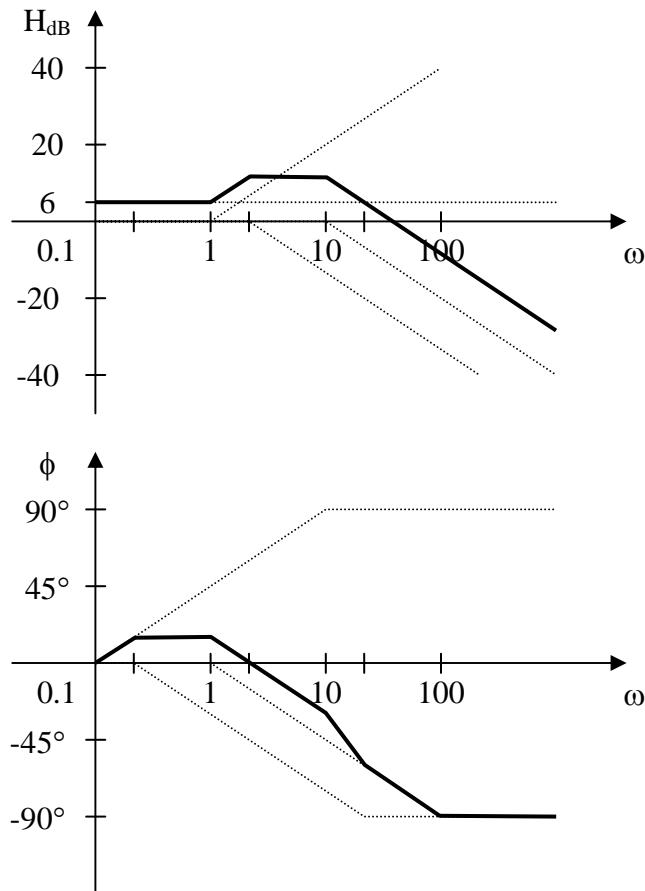
Chapter 14, Solution 15.

$$\mathbf{H}(\omega) = \frac{40(1+j\omega)}{(2+j\omega)(10+j\omega)} = \frac{2(1+j\omega)}{(1+j\omega/2)(1+j\omega/10)}$$

$$H_{dB} = 20\log_{10} 2 + 20\log_{10}|1+j\omega| - 20\log_{10}|1+j\omega/2| - 20\log_{10}|1+j\omega/10|$$

$$\phi = \tan^{-1}\omega - \tan^{-1}\omega/2 - \tan^{-1}\omega/10$$

The magnitude and phase plots are shown below.



Chapter 14, Solution 17.

$$\mathbf{G}(\omega) = \frac{(1/4)j\omega}{(1+j\omega)(1+j\omega/2)^2}$$

$$G_{dB} = -20\log_{10}4 + 20\log_{10}|j\omega| - 20\log_{10}|1+j\omega| - 40\log_{10}|1+j\omega/2|$$

$$\phi = -90^\circ - \tan^{-1}\omega - 2\tan^{-1}\omega/2$$

The magnitude and phase plots are shown below.

