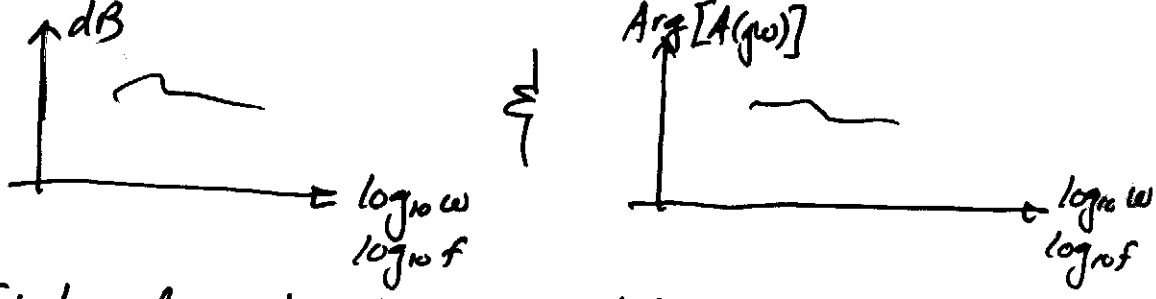
1.) Bode Plots

- A Bode plot is a plot of the magnitude of the transfer function in dB vs. $\log_{10}\omega$ or $\log_{10} f$.
- An asymptotic plot is a straight-line approximation to the actual magnitude in dB vs. $\log_{10}\omega$ or $\log_{10} f$.
- Can also have an asymptotic phase plot.

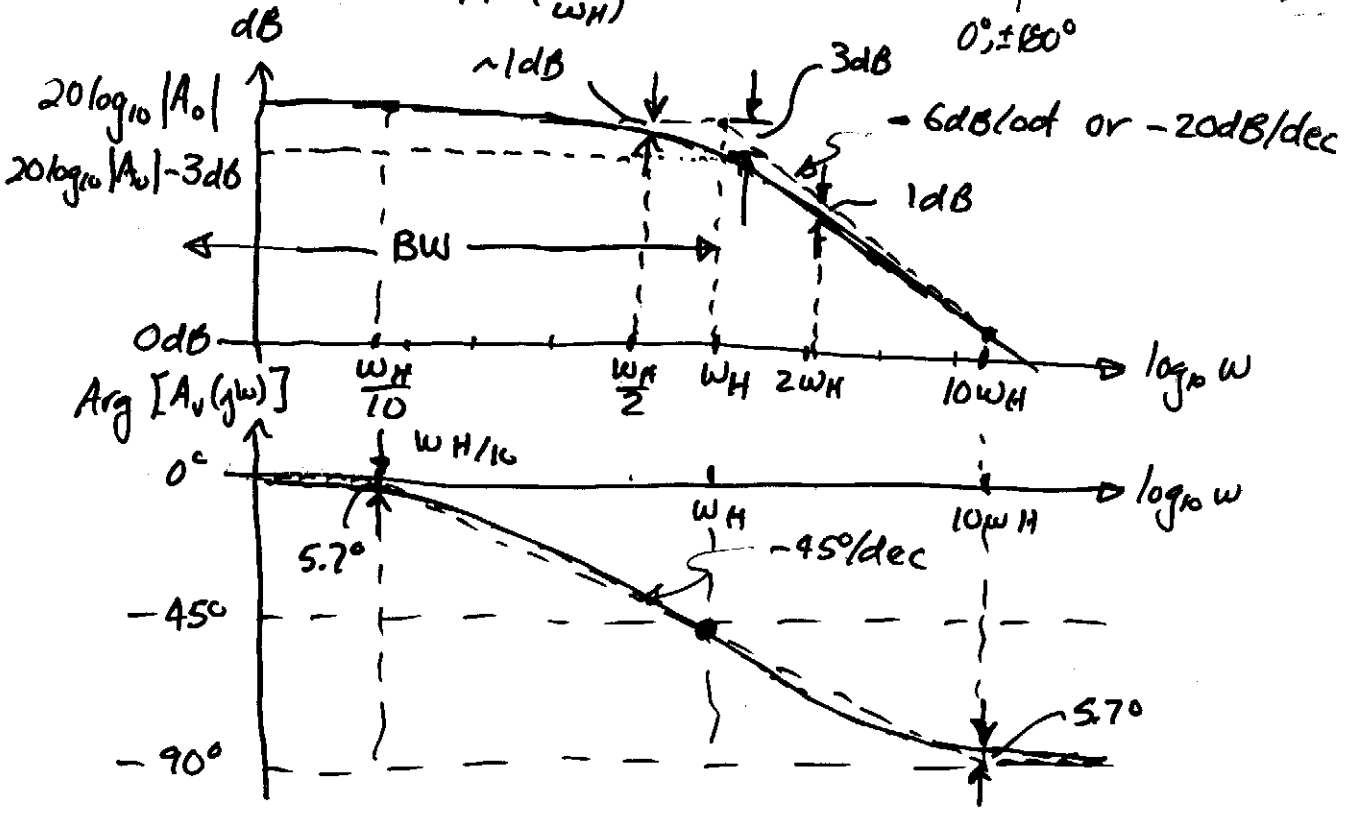


2.) First-order, low pass amplifier

$$A_V(s) = A_0 \frac{\omega_H}{s+\omega_H} = A_0 \frac{1}{\frac{s}{\omega_H}+1} \rightarrow \frac{1_0}{1+j\frac{\omega}{\omega_H}} = \frac{\pm A_0}{a+jb}$$

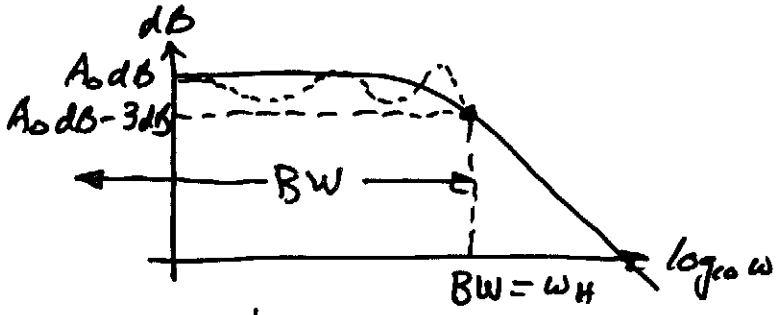
$$|A_V(j\omega)| = \frac{A_0}{\sqrt{1+\left(\frac{\omega}{\omega_H}\right)^2}} \quad \text{Arg}[A_V(j\omega)] = \angle A_0 - \tan^{-1}\left(\frac{\omega}{\omega_H}\right)$$

$\angle A_0$: $0°, \pm 180°$



3.) Bandwidth – (BW)

BW is the freq. range over which the amplitude of a transfer function is between A_0 dB and A_0 dB - 3dB.



Low pass

$a+jb$

4.) High Pass, First-order Amplifier

$$A_V(s) = A_0 \frac{s}{s+\omega_L} = A_0 \frac{\frac{s}{\omega_L}}{\frac{s}{\omega_L}+1}$$

$$|A_V(j\omega)| = \frac{A_0\left(\frac{\omega}{\omega_L}\right)}{\sqrt{1+\left(\frac{\omega}{\omega_L}\right)^2}} \quad \& \quad Arg[A_V(j\omega)] = \angle A_0 + \tan^{-1}\left(\frac{\frac{\omega}{\omega_L}}{0}\right) - \tan^{-1}\left(\frac{\omega}{\omega_L}\right)$$

$$= \angle A_0 + 90^\circ - \tan^{-1}\left(\frac{\omega}{\omega_L}\right)$$