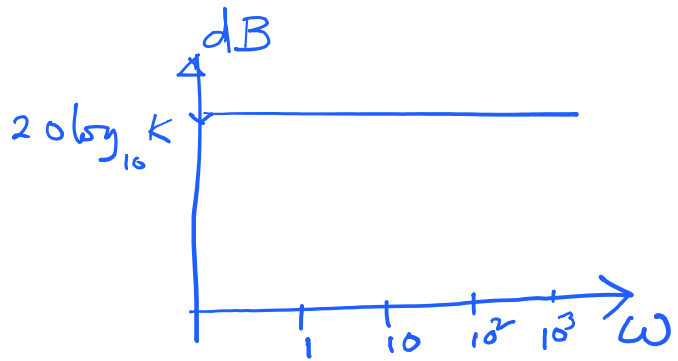


Bode Plot -2

Wednesday, September 21, 2016 8:24 AM

① $K \Rightarrow 20 \log_{10} K$

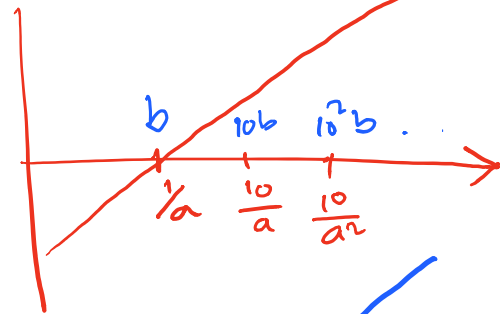


② $\frac{as}{1} \Rightarrow \frac{aj\omega}{1} \Rightarrow 20 \log_{10}(a\omega)$

$\frac{s}{b} \Rightarrow 20 \log_{10}\left(\frac{\omega}{b}\right)$

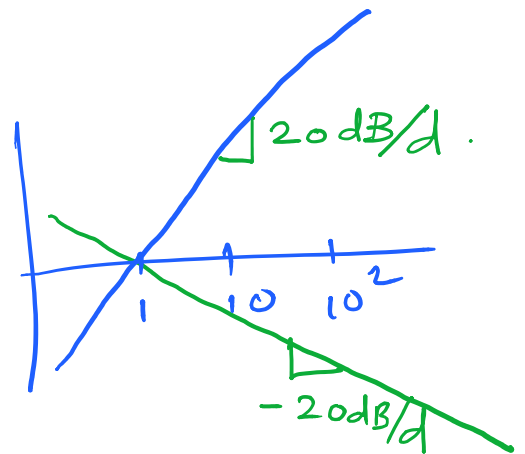
$aw=1 \Rightarrow \omega = \frac{1}{a}$

$\frac{\omega}{b}=1 \Rightarrow \omega = b$



③ $s \Rightarrow 20 \log_{10} \omega$

$\frac{1}{s} \Rightarrow$



④ $\left(\frac{1+as}{1+\frac{s}{b}} \right) \Rightarrow |1+jaw| = \sqrt{1+(a\omega)^2}$

$= \sqrt{1+\left(\frac{\omega}{b}\right)^2}$

Corner freq

$a\omega_c = 1$

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

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

$1 = \sqrt{1+1^2}$

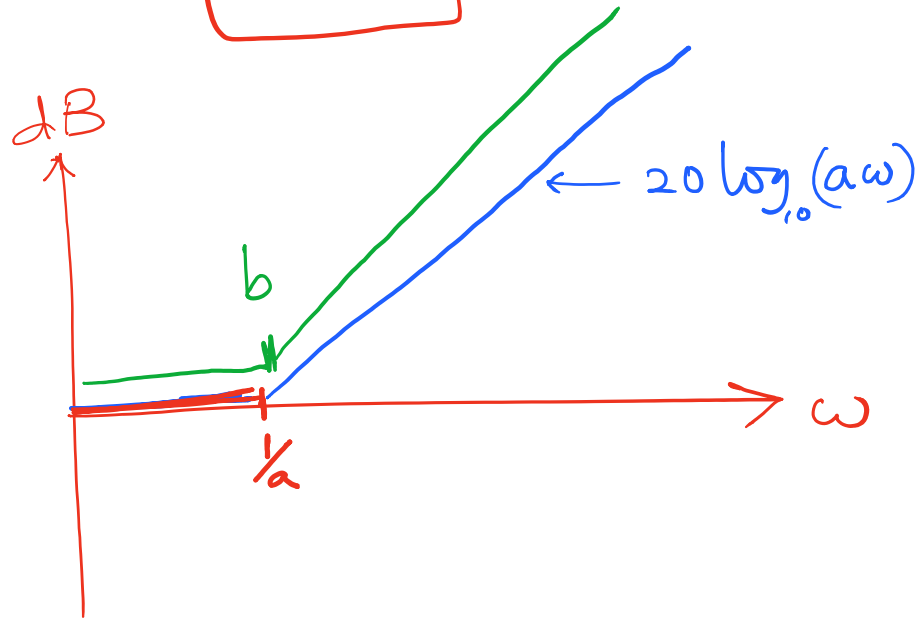
$= \sqrt{2}$

$dB: 20 \log_{10} \sqrt{2}$

$= \underline{\underline{3 dB}}$

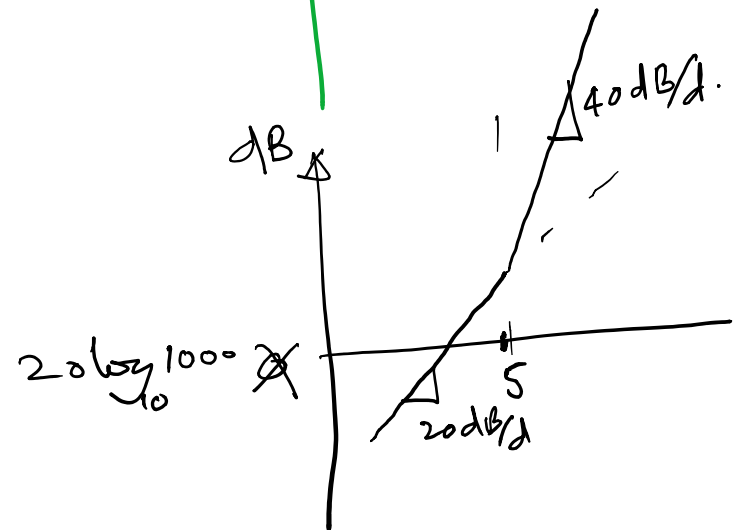
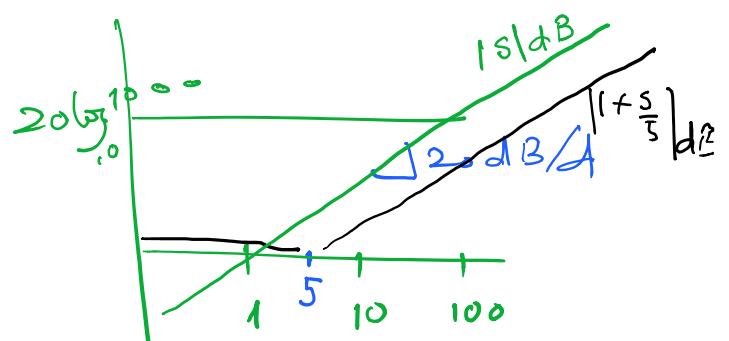
$\frac{\omega_c}{b} = 1$
 $\omega_c = b$

$\Rightarrow \omega_c$



$\odot (1+a\omega) \Rightarrow 20 \log_{10} \sqrt{1+(a\omega)^2} = 0$ for $(a\omega) \ll 1$

- $\odot 1000$
 - $\odot 5$
 - $\odot 1 + \frac{s}{5}$
- $\sphericalangle 90^\circ$



$$1 + \frac{s}{5} \Rightarrow 1 + \frac{j\omega}{5}$$

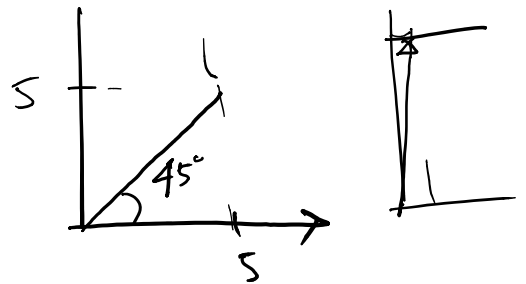
$$\theta = \angle \tan^{-1} \frac{\omega}{5}$$

$$1 + \frac{s}{b} \Rightarrow \theta = \tan^{-1} \frac{\omega}{b}$$

$$\omega = 5 = \omega_c \quad \theta = \tan^{-1} 1 = 45^\circ$$

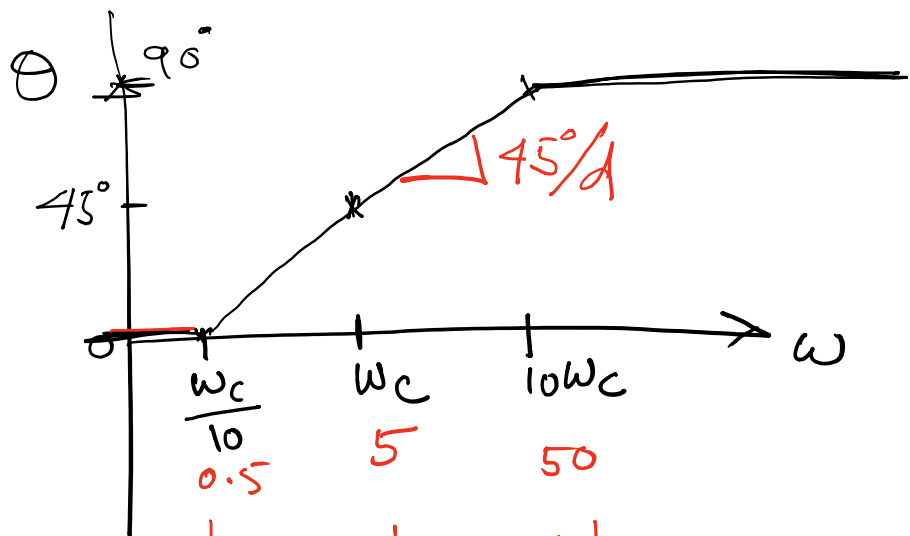
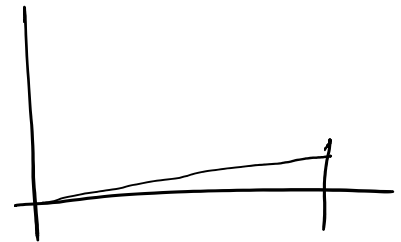
$$\omega = 50 = 10\omega_c$$

$$\theta = 84.3^\circ \approx 90^\circ$$



$$\omega = 0.5 = \frac{\omega_c}{10}$$

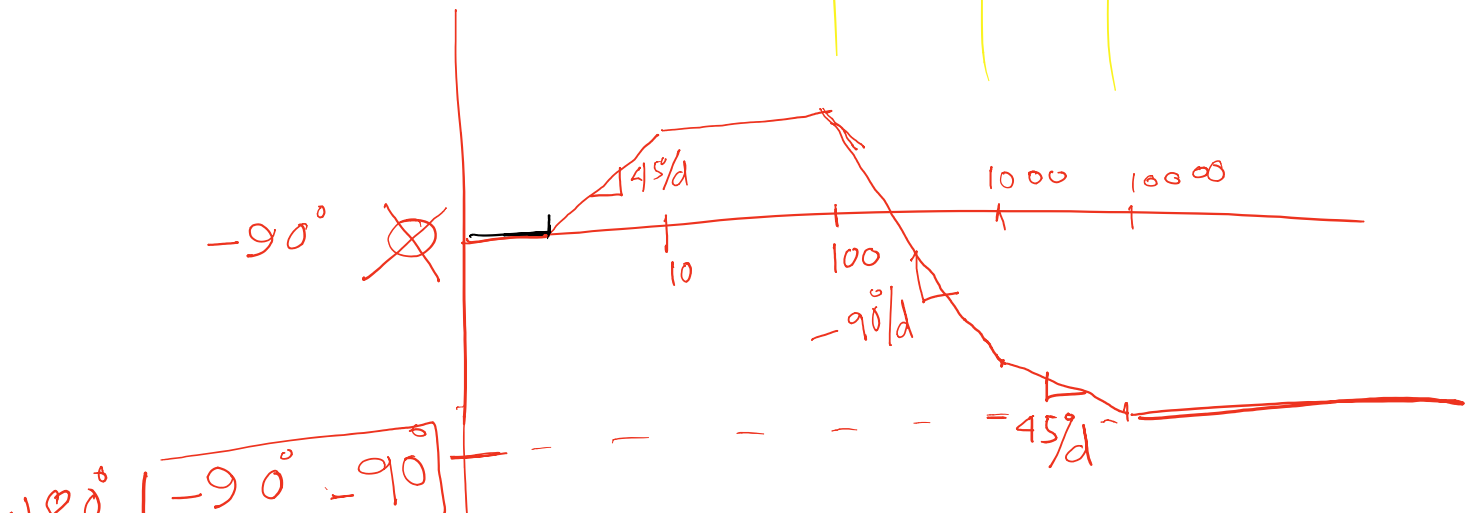
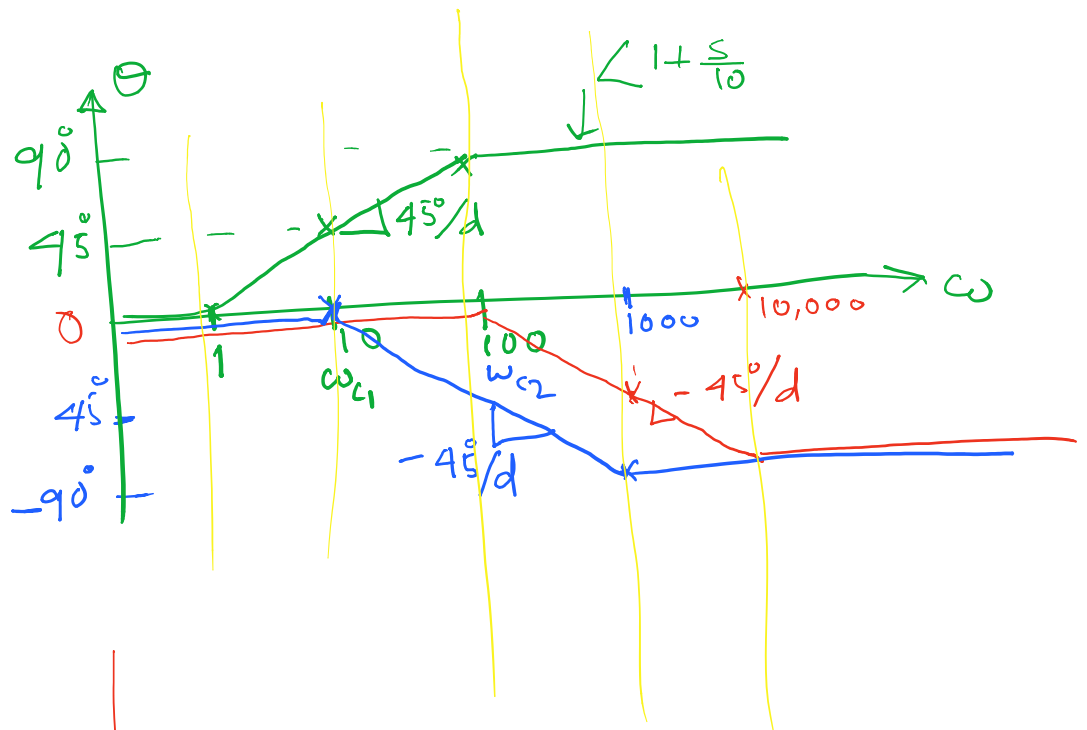
$$\theta = 5^\circ \approx 0$$



0.5	0	50
$\frac{b}{10}$	b	$10b$

$$T(s) = 10^4 \cdot \frac{(1 + \frac{s}{10})}{s(1 + \frac{s}{100})(1 + \frac{s}{1000})}$$

$\omega_{c1} = 10$
 $\omega_{c2} = 100$
 $\omega_{c3} = 1000$



$$-180^\circ \left[\begin{array}{c} -90^\circ \\ -90^\circ \end{array} \right] \left| \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{array} \right. \begin{array}{c} -45^\circ/d \end{array}$$

$$\textcircled{1} \quad T(s) = \frac{10^5 s}{(5+s)(100+s)}$$

$$= \frac{10^5 s}{5 \left[1 + \frac{s}{5} \right] \left[1 + \frac{s}{100} \right] 100} = \frac{200 s}{\left(1 + \frac{s}{5} \right) \left(1 + \frac{s}{100} \right)}$$

