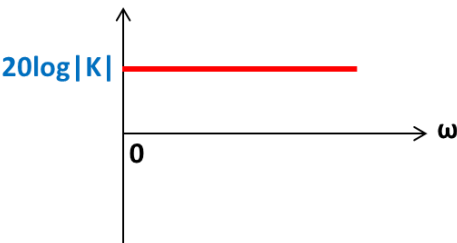
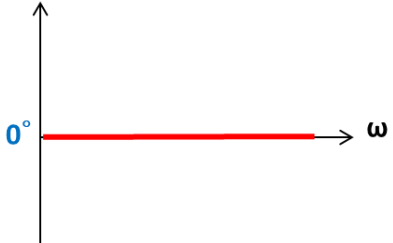
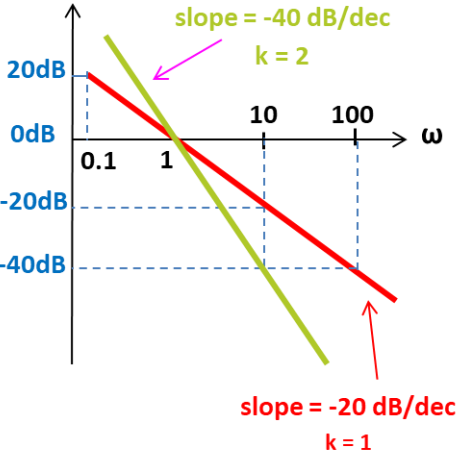

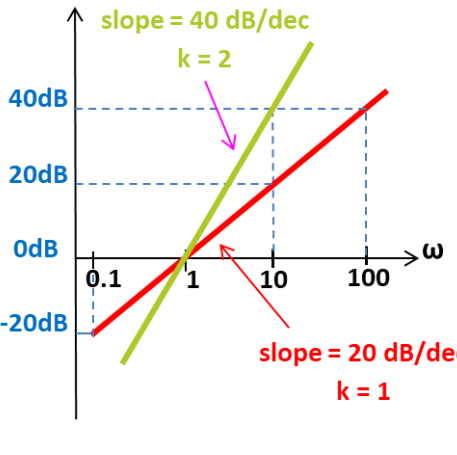

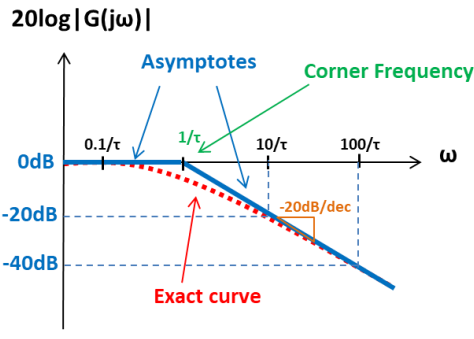
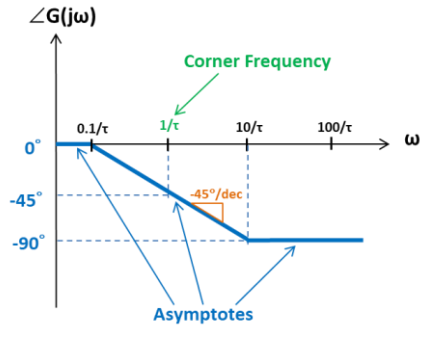
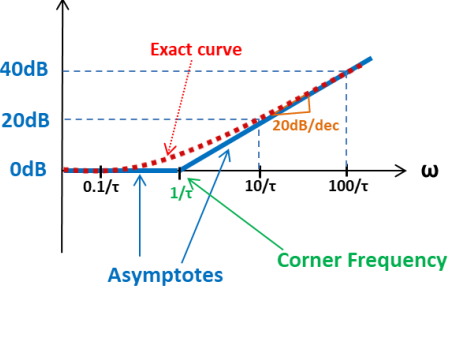
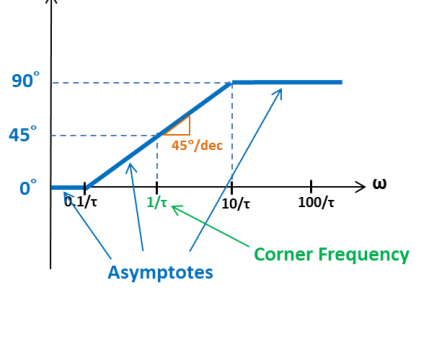
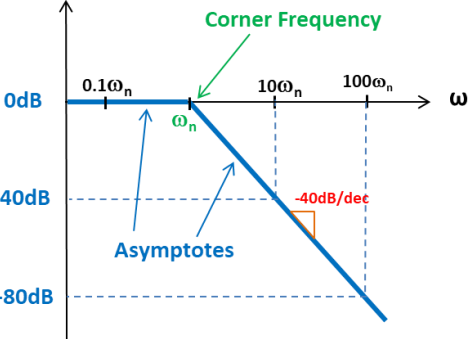
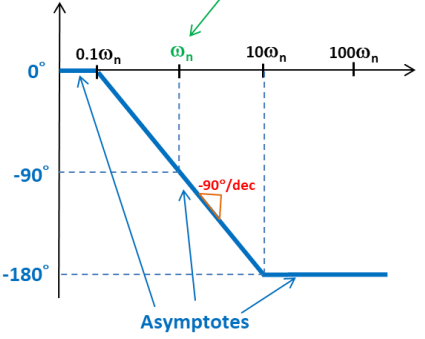


Asymptotic Bode Plot of Basic Factors

Basic Factor	Magnitude $ G(j\omega) _{dB} = 20\log G(j\omega) $	Phase $\phi = \angle G(j\omega)$
Constant Gain $G(s) = K$ $G(j\omega) = K$	$20\log G(j\omega) $ 	$\angle G(j\omega)$ 
Integral Factor $G(s) = \frac{1}{s^k}$ $G(j\omega) = \frac{1}{(j\omega)^k}$	$20\log G(j\omega) $ 	$\angle G(j\omega)$ 
Derivative Factor $G(s) = s^k$ $G(j\omega) = (j\omega)^k$	$20\log G(j\omega) $ 	$\angle G(j\omega)$ 

Basic Factor	Magnitude $ G(j\omega) _{dB} = 20\log G(j\omega) $	Phase $\phi = \angle G(j\omega)$
<p>Single Pole</p> $G(s) = \frac{1}{1 + \tau s}$ $G(j\omega) = \frac{1}{1 + j\omega\tau}$		
<p>Single Zero</p> $G(s) = 1 + \tau s$ $G(j\omega) = 1 + j\omega\tau$		
<p>Complex Conjugate Poles ($0 < \zeta < 1$)</p> $G(s) = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$ $G(j\omega) = \frac{1}{1 + 2\zeta\frac{j\omega}{\omega_n} + \left(\frac{j\omega}{\omega_n}\right)^2}$ $= \frac{1}{1 - \left(\frac{\omega}{\omega_n}\right)^2 + j2\zeta\frac{\omega}{\omega_n}}$		

Bode Diagram ($w_n = 1$ rad/sec)

