Asymptotic Bode Plot of Basic Factors

Basic Factor	Magnitude $ G(j\omega) dB= 20 \log G(j\omega) $	Phase $oldsymbol{\phi} = \angle G(oldsymbol{j}oldsymbol{\omega})$
Constant Gain $G(s) = K$ $G(j\omega) = K$	$20log G(j\omega) $ $20log K $ 0	∠G(jω) 0° ————————————————————————————————————
Integral Factor $G(s) = rac{1}{s^k}$ $G(j\omega) = rac{1}{(j\omega)^k}$	20log G(jω) 20dB 0dB -20dB -40dB slope = -40 dB/dec k = 2 0 10 100 ω slope = -20 dB/dec k = 1	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
Derivative Factor $G(s)=s^k$ $G(j\omega)=(j\omega)^k$	20log G(jω) slope = 40 dB/dec k = 2 40dB 0dB -20dB slope = 20 dB/dec k = 1	$ \begin{array}{c c} \angle G(j\omega) \\ \hline 180^{\circ} & & k = 2 \\ \hline 90^{\circ} & & k = 1 \\ \hline 0^{\circ} & & \rightarrow \omega \end{array} $

Basic Factor	Magnitude $ G(j\omega) dB=$ $20\mathrm{log} G(j\omega) $	Phase $\phi = \angle G(j\omega)$
Single Pole $G(s) = rac{1}{1+ au s}$ $G(j\omega) = rac{1}{1+j\omega au}$	20log G(jω) Asymptotes Corner Frequency 0.1/τ 100/τ 100/τ ω -20dB -40dB Exact curve	Corner Frequency 0° -45° Asymptotes ω
Single Zero $G(s)=1+ au s$ $G(j\omega)=1+j\omega au$	20log G(jω) 40dB 20dB 0dB 0.1/τ 10/τ 100/τ ω Asymptotes Corner Frequency	2G(jω) 45° 0° C1/τ 1/τ 10/τ 100/τ Corner Frequency
Complex Conjugate Poles (0 < ζ < 1) $G(s) = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$ $G(j\omega) = \frac{1}{1 + 2\zeta\frac{j\omega}{\omega_n} + \left(\frac{j\omega}{\omega_n}\right)^2}$ $= \frac{1}{1 - \left(\frac{\omega}{\omega_n}\right)^2 + j2\zeta\frac{\omega}{\omega_n}}$	20log G(jω) Corner Frequency 0.1ω _n 10ω _n 100ω _n 40dB/dec Asymptotes	Corner Frequency $0^{\circ} \qquad 0.1\omega_{n} \qquad 0_{n} \qquad 100\omega_{n} \qquad \omega$ $-90^{\circ} \qquad -180^{\circ}$ Asymptotes

