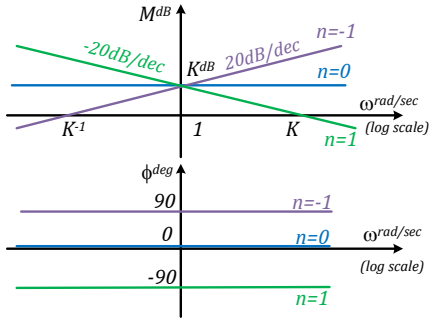
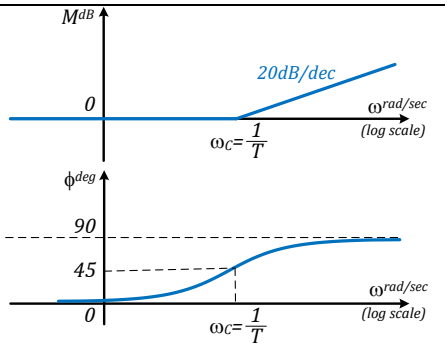
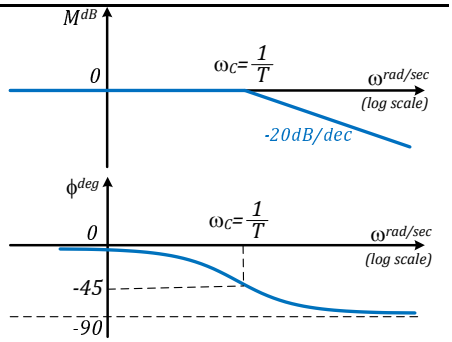
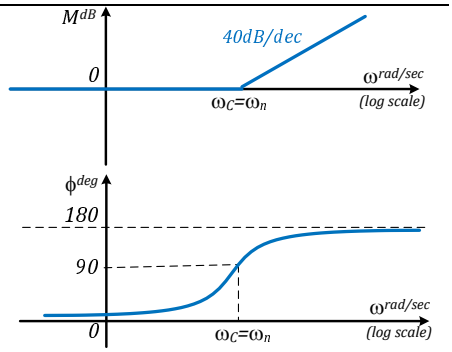
Rules for sketching Bode plots

Factor	Magnitude, M^{dB}	Phase, ϕ^{deg}	Sketch
$\frac{K}{s^n}$	• straight line • $M^{dB}\|_{\omega=1} = K^{dB}$ • $\omega\|_{M^{dB}=0} = K^{1/n}$ • slope: $-20n$ dB/dec	• $\phi = -90° \cdot n$	
$T \cdot s + 1$	• Low frequency asymptote at 0dB • High frequency asymptote: slope = 20dB/dec • Corner frequency $\omega_c = \frac{1}{T}$	• arctangent • $\phi \in (0,\ 90°)$ • inflection $(\omega_c,\ 45°)$	
$\frac{1}{T \cdot s + 1}$	• Low frequency asymptote at 0dB • High frequency asymptote: slope = −20dB/dec • Corner frequency $\omega_c = \frac{1}{T}$	• arctangent • $\phi \in (0,\ -90°)$ • inflection $(\omega_c,\ -45°)$	
$\frac{1}{\omega_n^2}s^2 + \frac{2\zeta}{\omega_n}s + 1$	• Low frequency asymptote at 0dB • High frequency asymptote: slope = 40dB/dec • Corner frequency $\omega_c = \omega_n$	• arctangent • $\phi \in (0,\ 180°)$ • inflection $(\omega_c,\ 90°)$	
$\frac{1}{\frac{1}{\omega_n^2}s^2 + \frac{2\zeta}{\omega_n}s + 1}$	• Low frequency asymptote at 0dB • High frequency asymptote: slope = −40dB/dec • Corner frequency $\omega_c = \omega_n$	• arctangent • $\phi \in (0,\ -180°)$ • inflection $(\omega_c,\ -90°)$