EENG307: Bode Plots for First Order Systems[1]
Lecture 25

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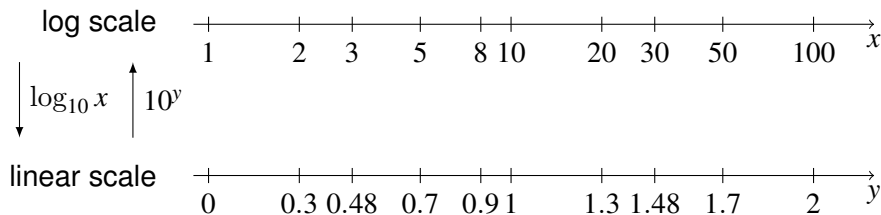Colorado School of Mines

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[2] Developed and edited by Tyrone Vincent and Kathryn Johnson, Colorado School of Mines, with contributions from Salman Mohagheghi, Chris Coulston, Kevin Moore, CSM and Matt Kupilik, University of Alaska, Anchorage
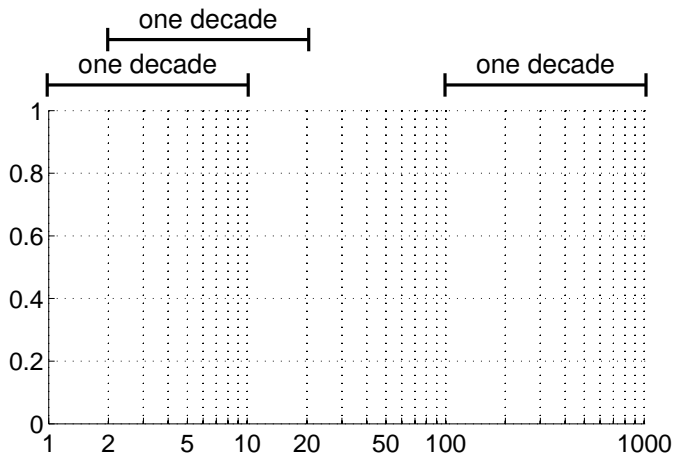
Magnitude Table

$\frac{\omega}{\sigma}$	$\frac{K}{\sqrt{\left(\frac{\omega}{\sigma}\right)^2+1}}$	$-\tan^{-1}\left(\frac{\omega}{\sigma}\right)$ radians	degrees
.01	K	-0.01	$-0.58°$
0.1	$\frac{K}{1.005}$	-0.0997	$-5.7°$
1	$\frac{K}{\sqrt{2}}$	-0.785	$-45°$
10	$\frac{K}{10.05}$	-1.47	$-84.3°$
100	$\frac{K}{100}$	-1.56	$-89.4°$

Log scale

log scale

$$1 \quad 2 \quad 3 \quad 5 \quad 8 \ 10 \quad 20 \ 30 \quad 50 \quad 100 \qquad x$$

$\log_{10} x \quad \Big| \ 10^y$

linear scale

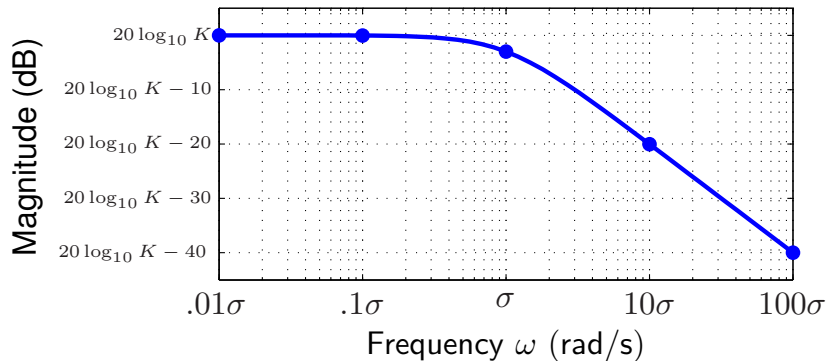$$0 \quad 0.3 \ 0.48 \quad 0.7 \ 0.9 \ 1 \quad 1.3 \ 1.48 \ 1.7 \quad 2 \qquad y$$
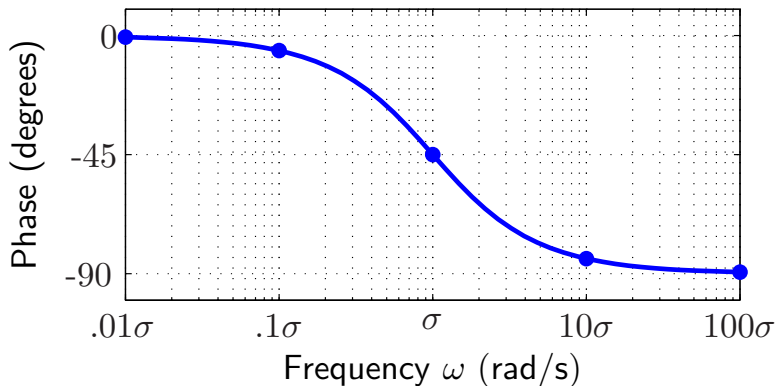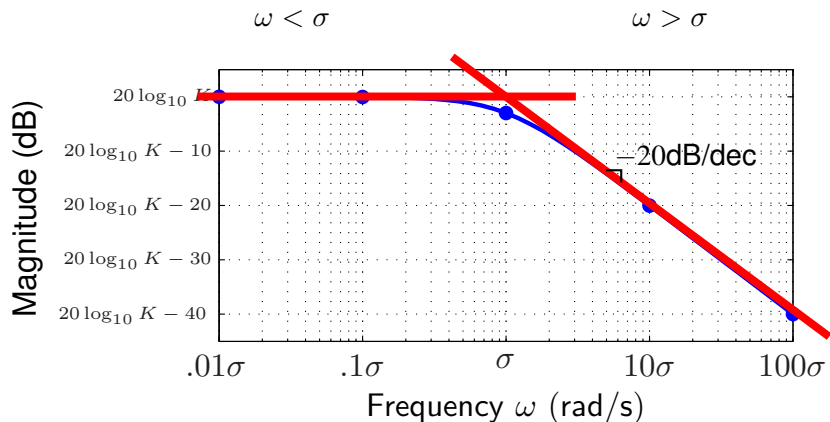
Plot with log-scale on x-axis
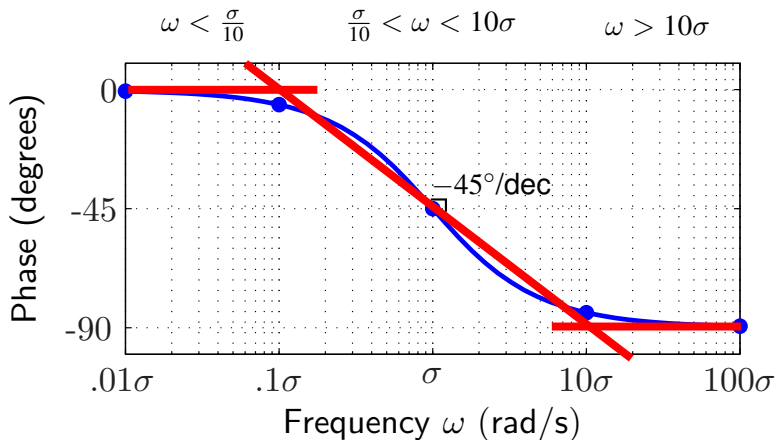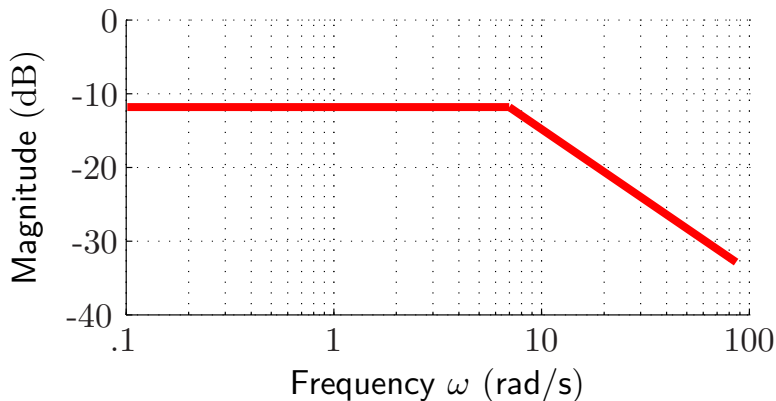
Magnitude Bode plot

Phase Bode plot

Linear Approximation for Magnitude Bode plot

Linear Approximation for Phase Bode plot

Bode magnitude plot example

Bode phase plot example