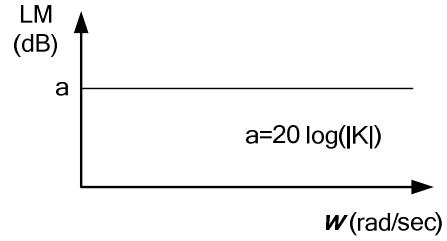
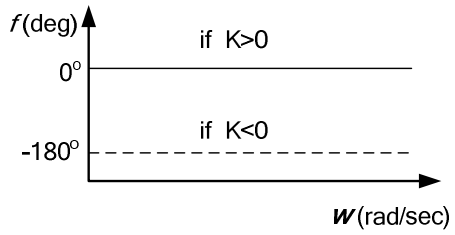
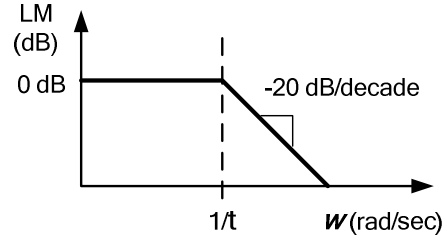
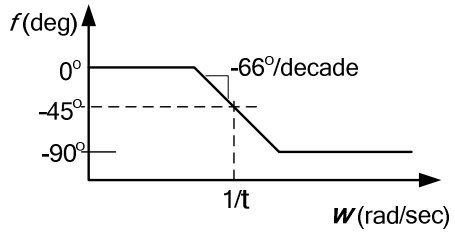
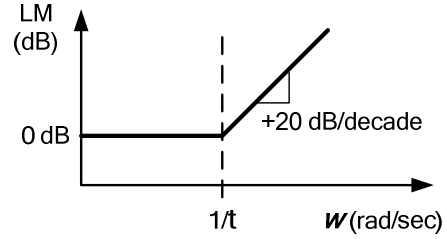
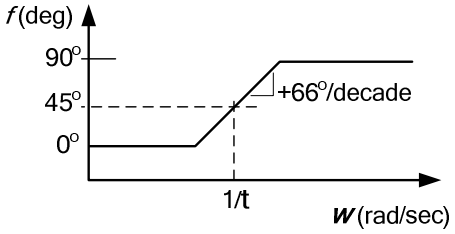
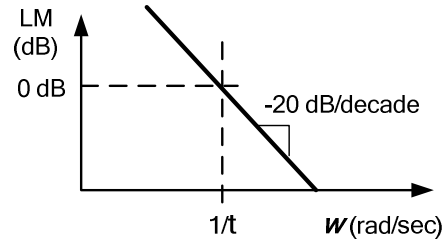
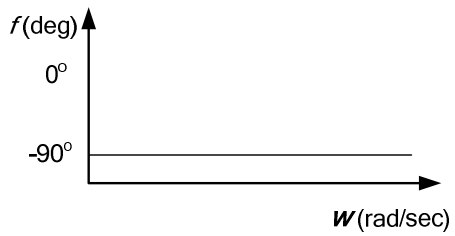
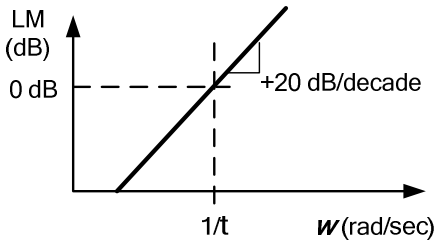
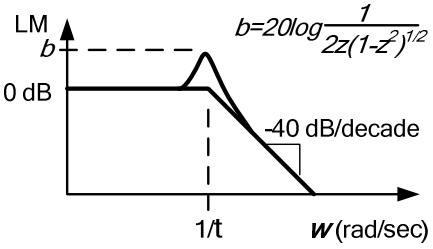
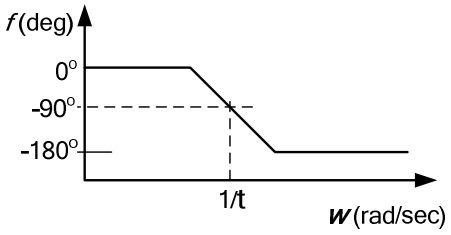
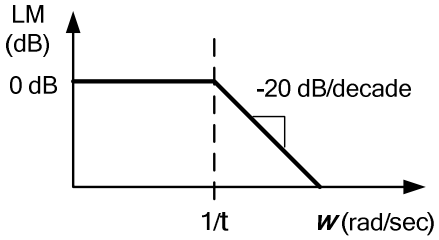
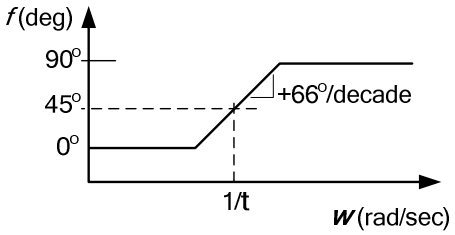
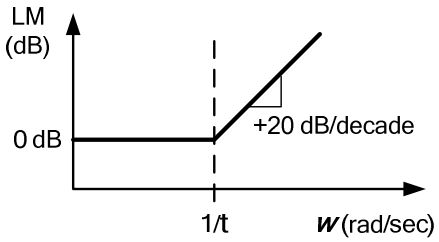
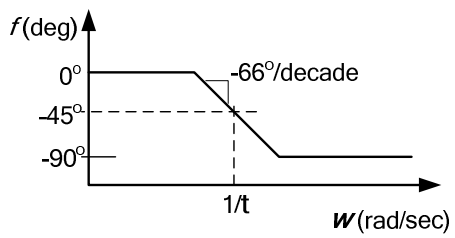
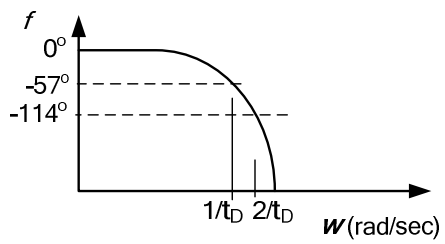
CM3310 Spring 2008

(Dr. Tom Co, 3/21/2008)

Lecture 16. Bode Plots

1. Simplified Bode Plots of Typical Transfer Functions

Name	LM vs. Freq	Phase vs. Freq
Gain $= K$		
1st Order Lag $= \frac{1}{\tau s + 1}$		
1st Order Lead $= \tau s + 1$		
Integrator $= \frac{1}{\tau s}$		

Differ-entiator $= \tau s$		
2nd Order Lag $\frac{1}{\tau^2 s^2 + 2\zeta\tau s + 1}$		
1st Order Unstable Lag $= \frac{1}{-\tau s + 1}$		
1st Order Unstable Lead $= -\tau s + 1$		
Delay $= e^{\tau_D s}$		

Note: details given in www.chem.mtu.edu/~tbco/cm416/TFBODE.html

2. Bode Plots of Transfer Functions in Series

$$LM(G_1G_2) = LM(G_1) + LM(G_2)$$

$$\phi(G_1G_2) = \phi(G_1) + \phi(G_2)$$