Chapter 11

Design via Frequency Response

Figure 11.1
Bode plots showing gain adjustment for a desired phase margin

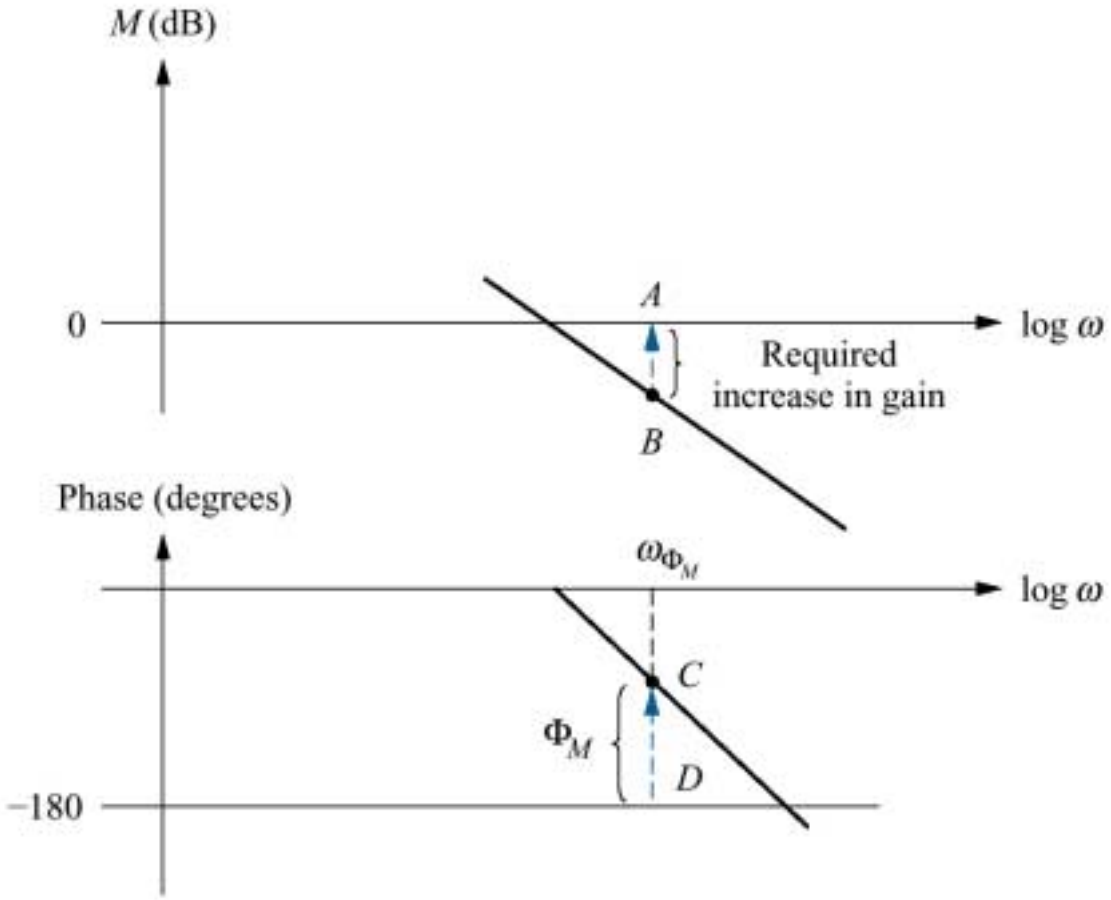


Figure 11.2
System for
Example 11.1

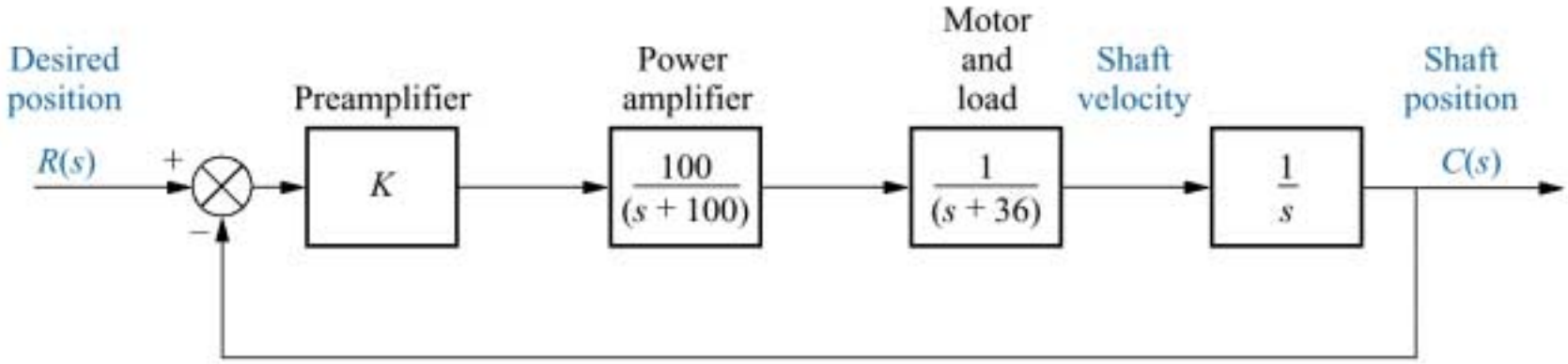


Figure 11.3
Bode magnitude and phase plots for Example 11.1

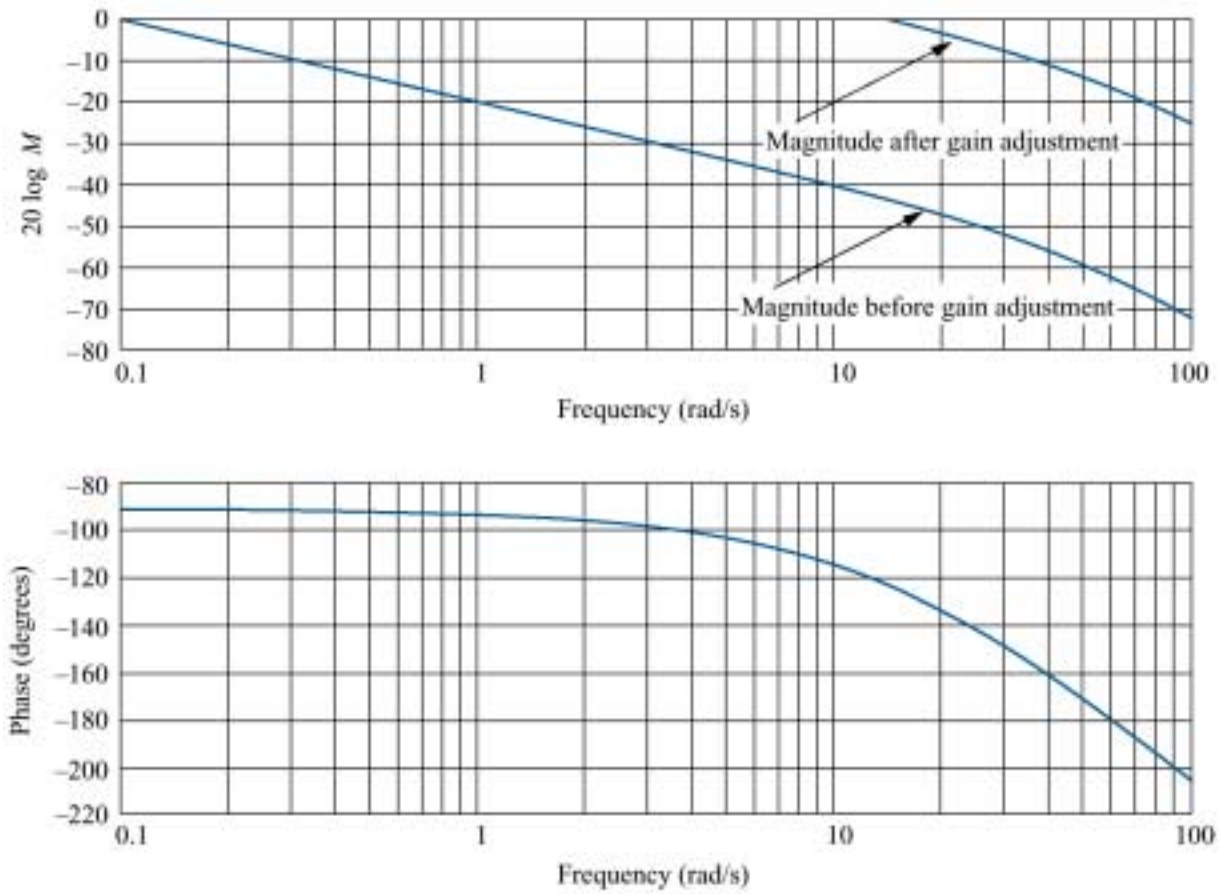


Figure 11.4
Visualizing lag compensation

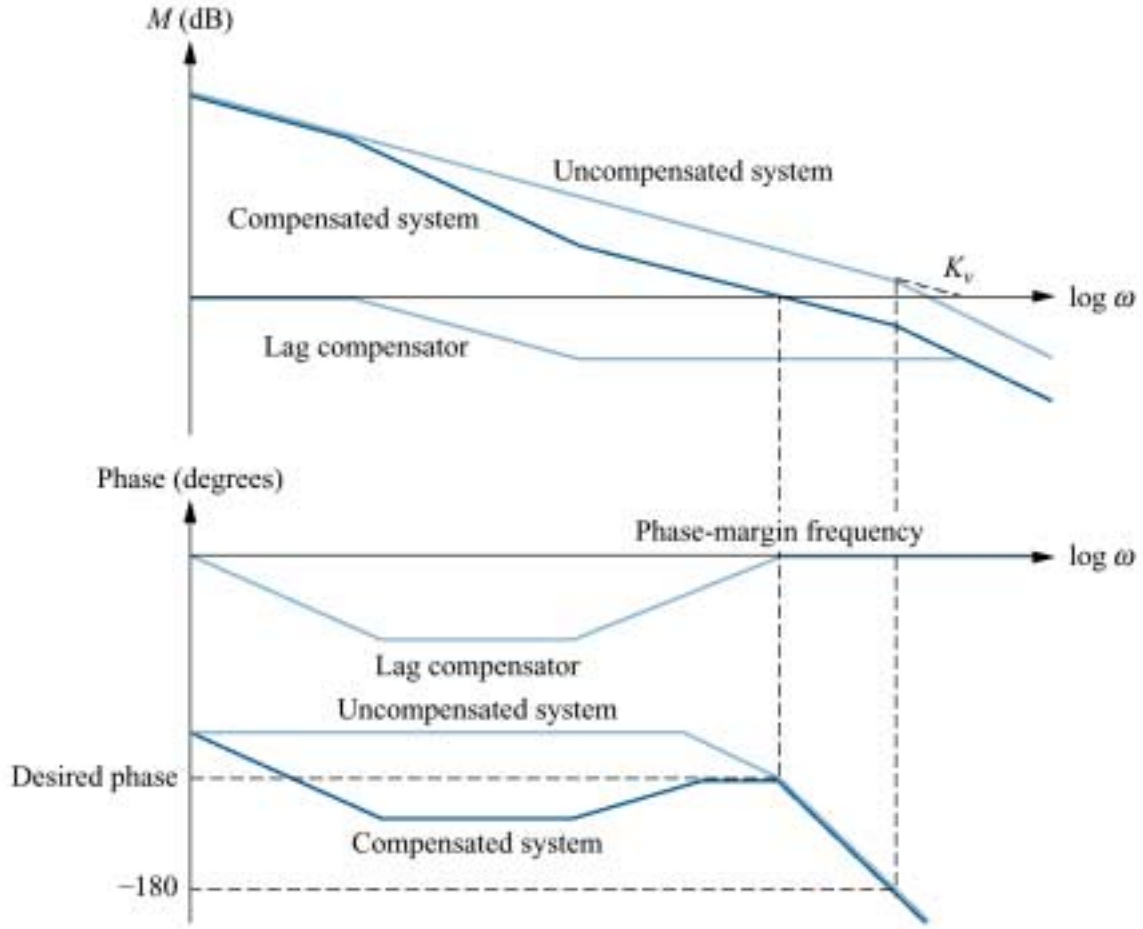


Figure 11.5
Frequency response plots of a lag compensator,
$G_c(s) = (s + .1)/(s + .01)$

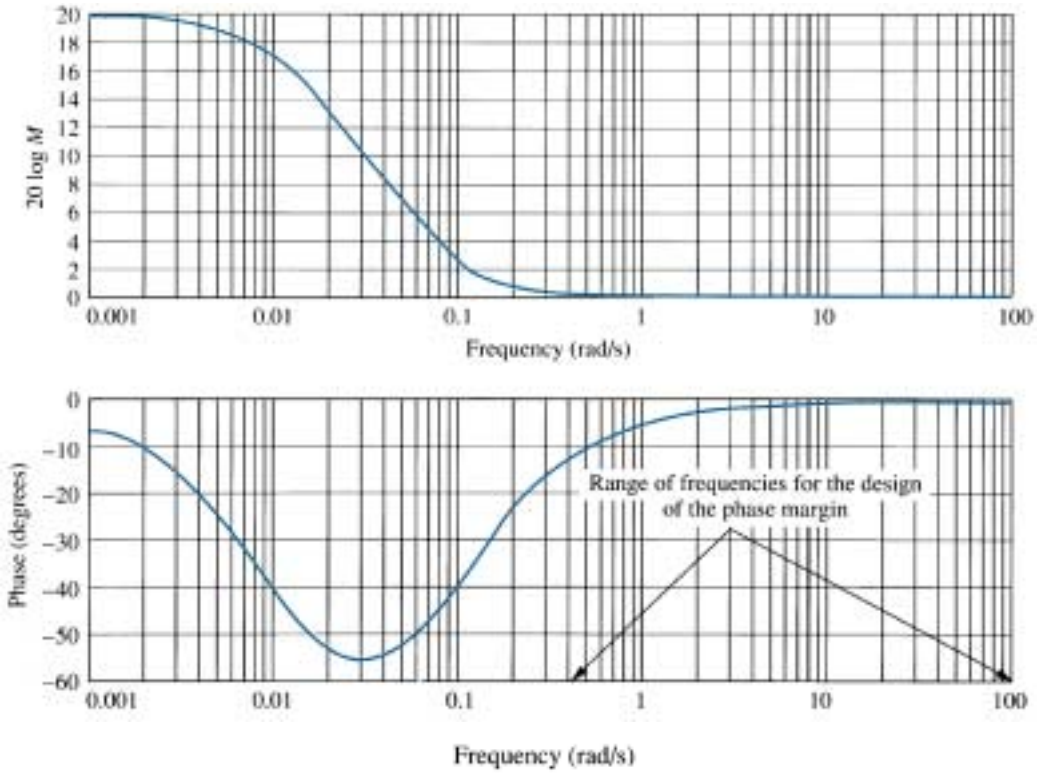


Figure 11.6
Bode plots for
Example 11.2

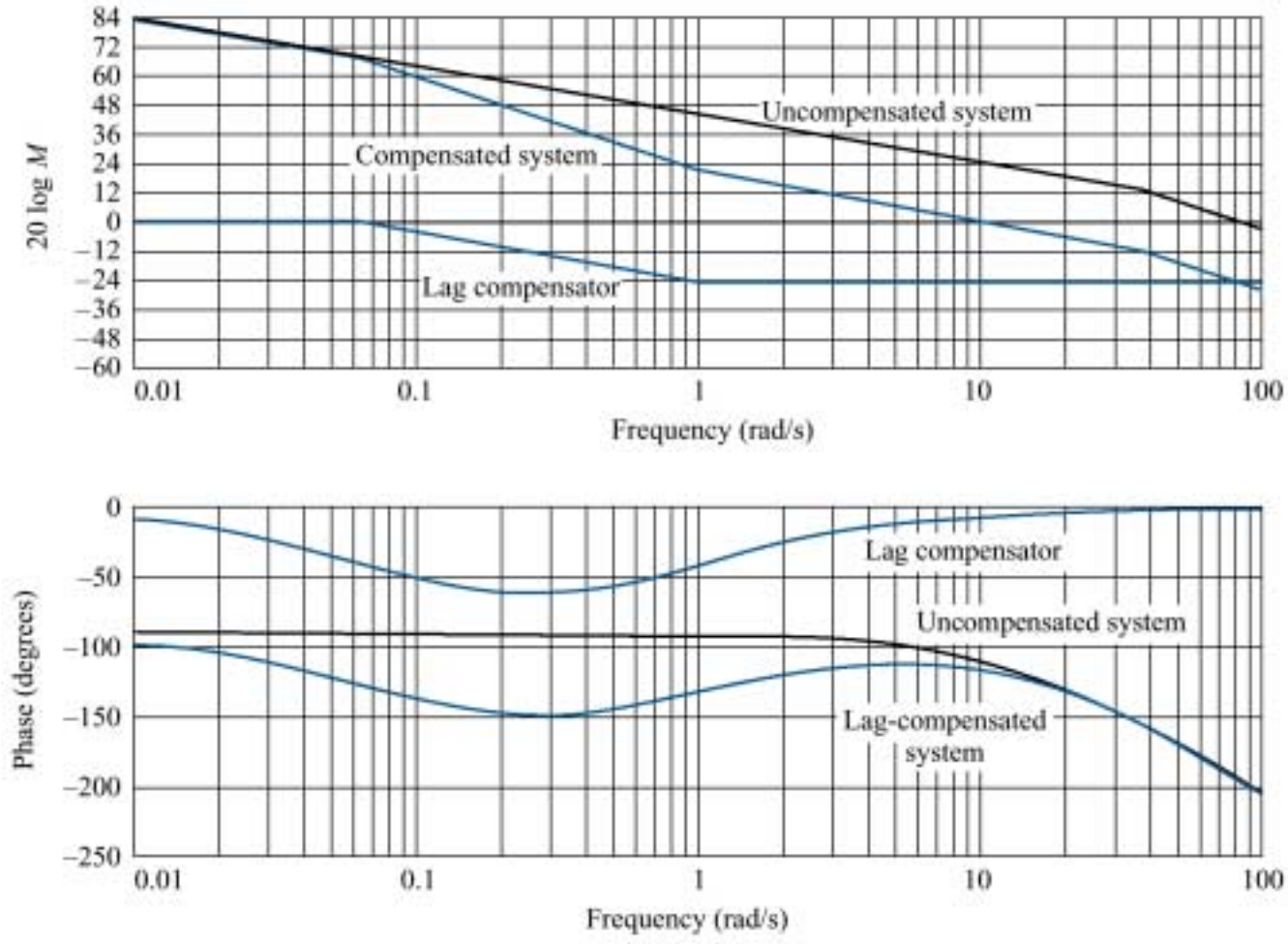


Figure 11.7
Visualizing lead compensation

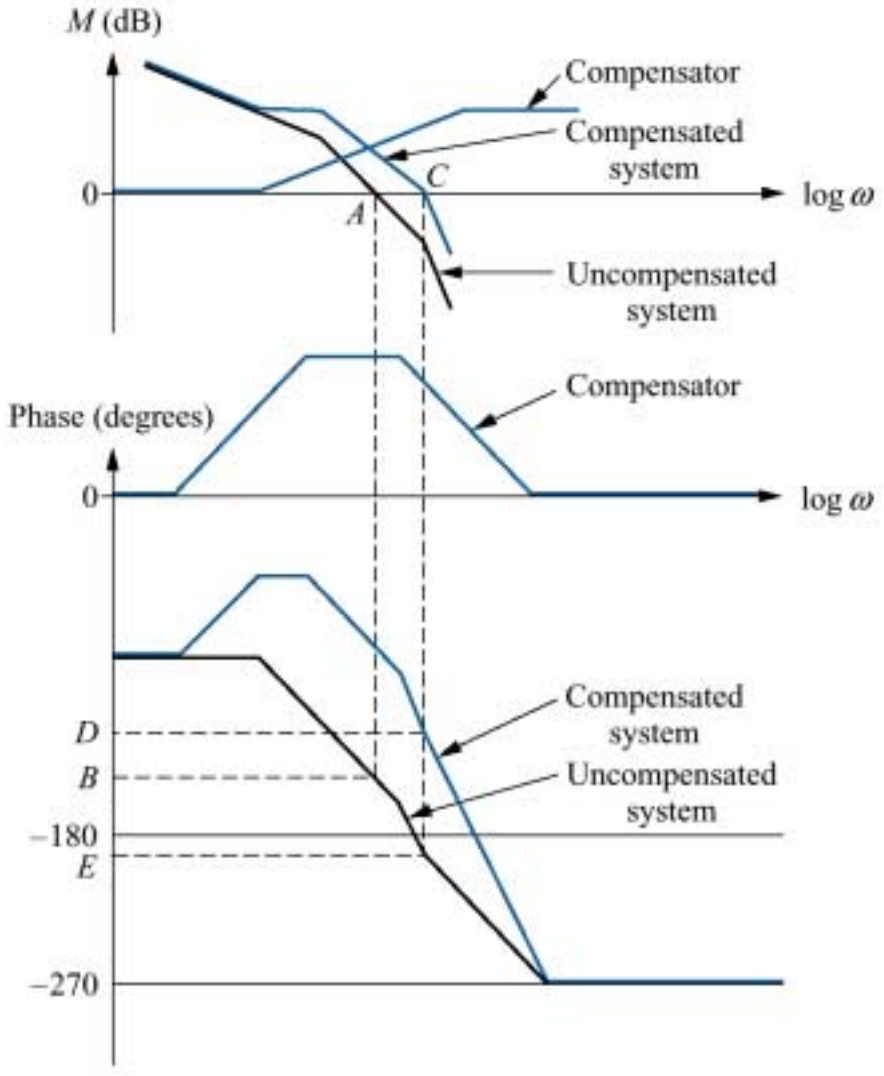


Figure 11.8
Frequency response of a lead compensator, $G_c(s) = [1/\beta][(s + 1/T)/(s + 1/\beta T)]$

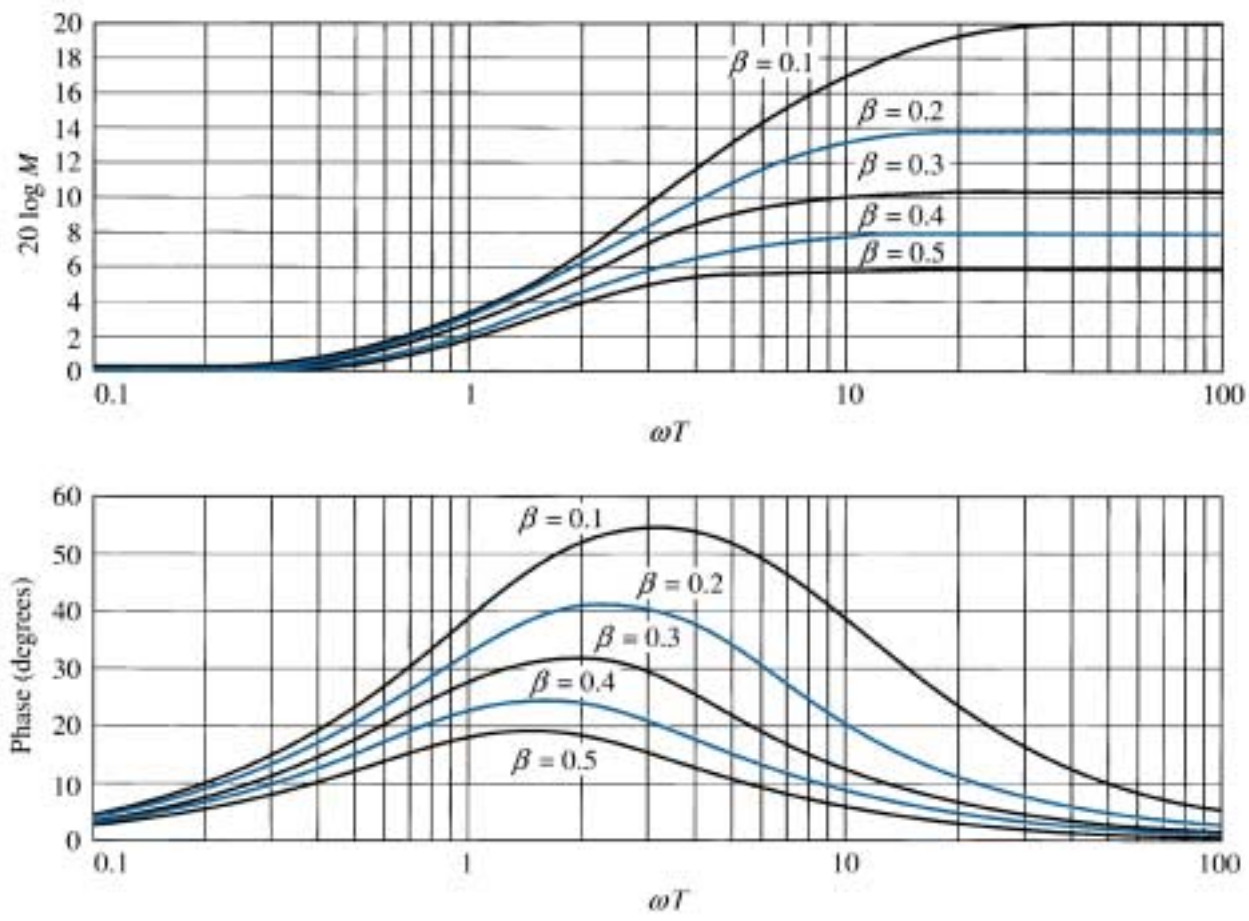


Figure 11.9
Bode plots for lead compensation in Example 11.3

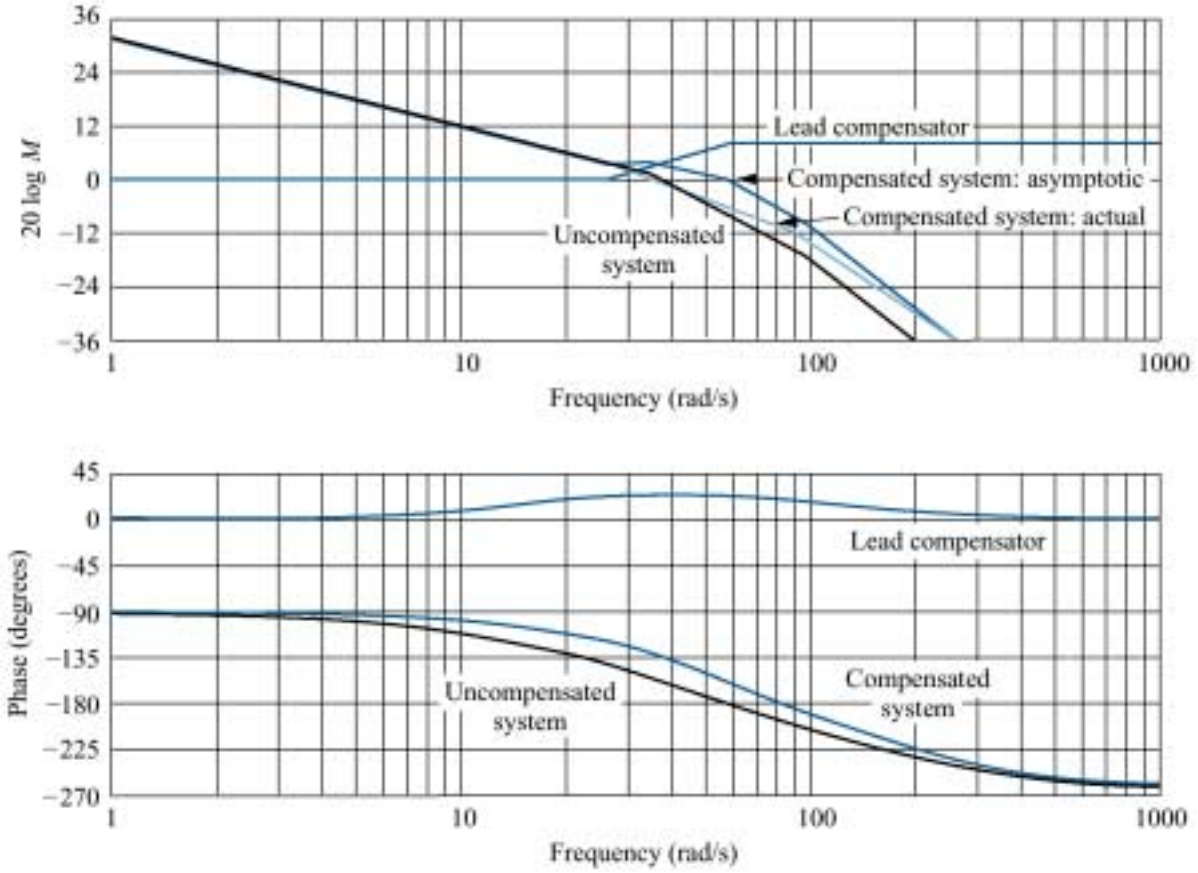
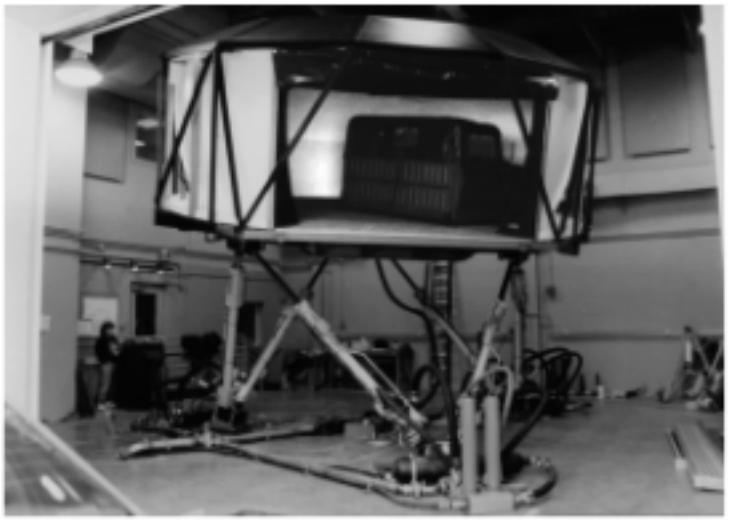


Figure 11.10
a. The Iowa Driving Simulator;
b. test driving the simulator with its realistic graphics



(a)

(b)

Figure 11.11
Sample frequency response curves for a lag-lead compensator, $G_c(s) = [(s + 1)(s + 0.1)] / [(s + \gamma)(s + \frac{0.1}{\gamma})]$

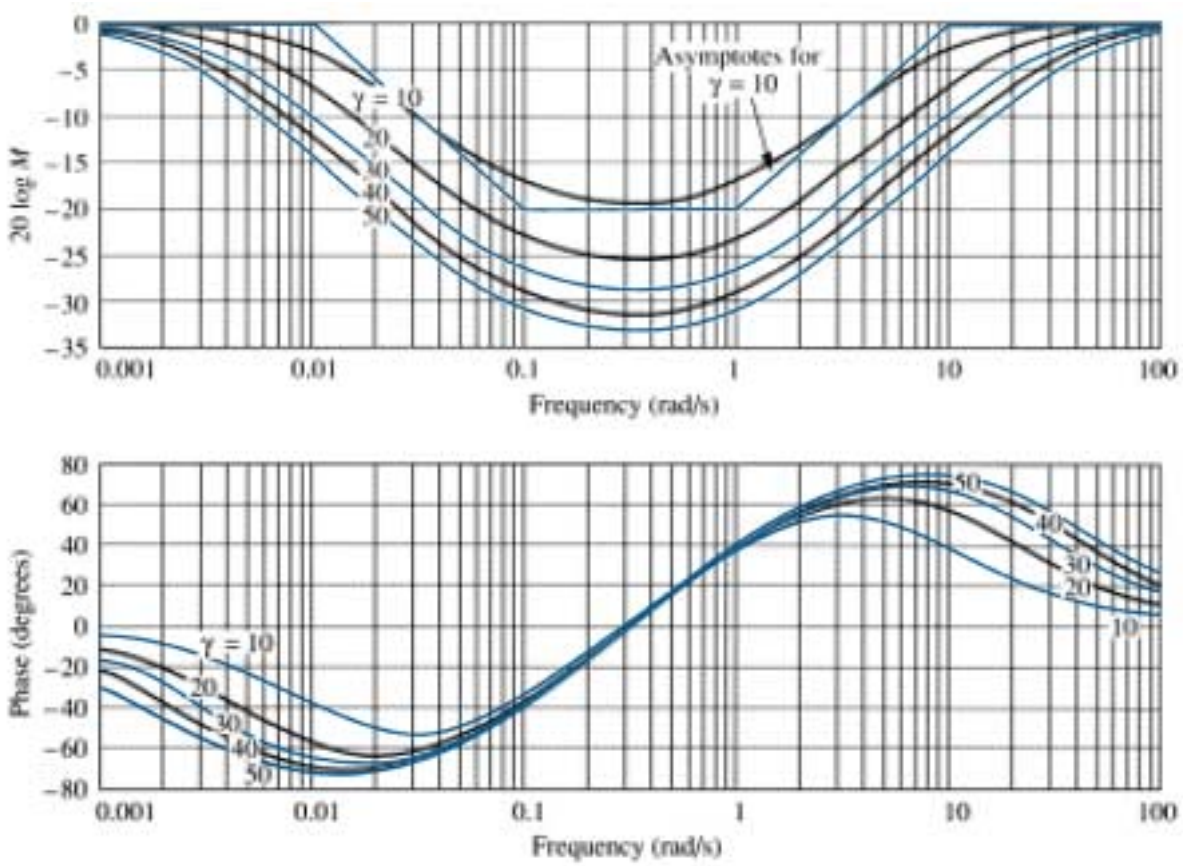


Figure 11.12
Bode plots for lag-lead compensation in Example 11.4

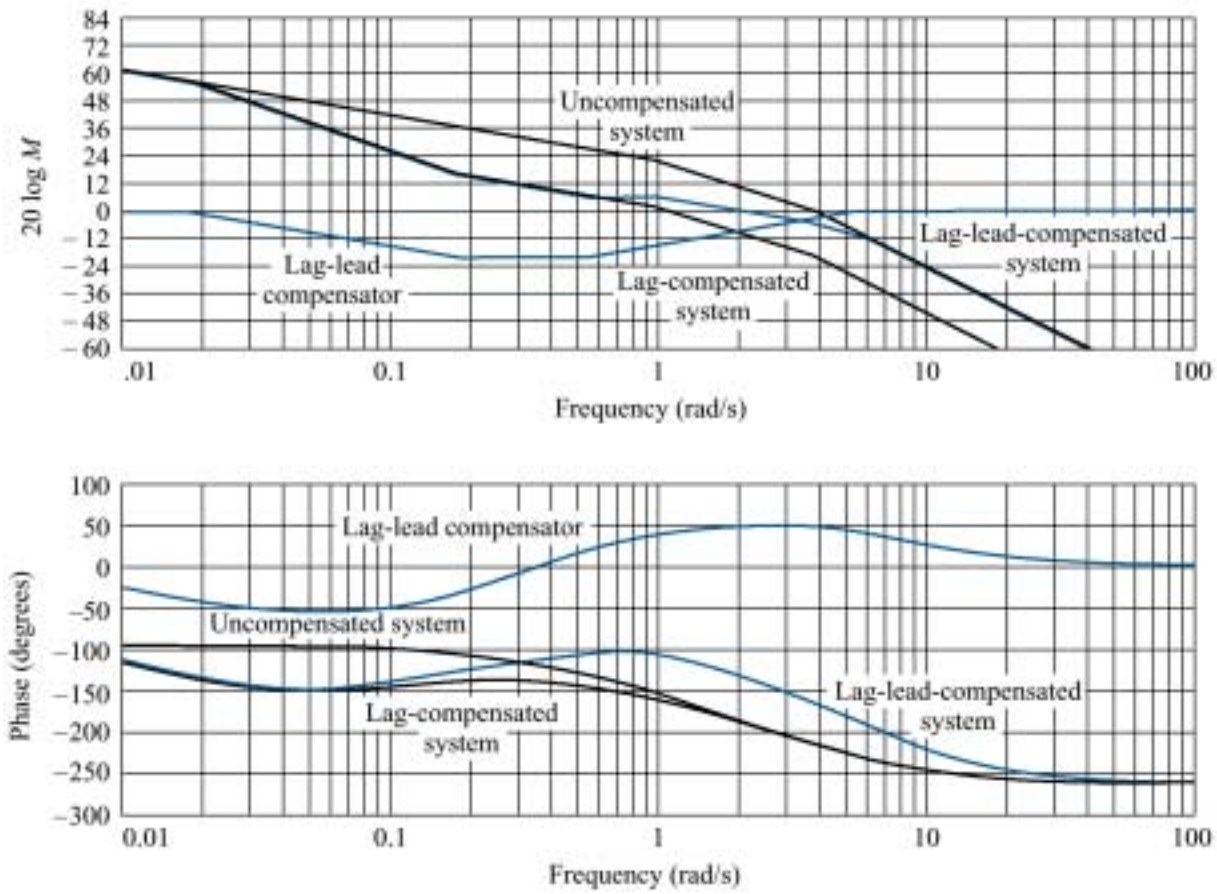


Figure P11.1

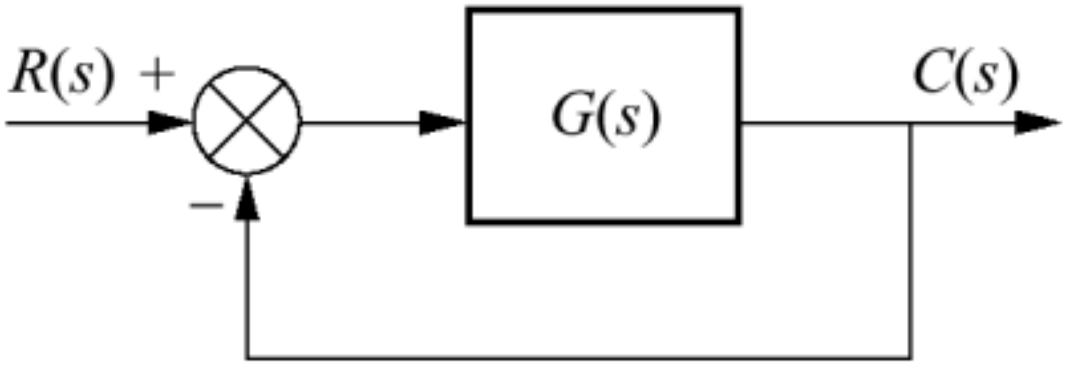


Figure P11.2
Towed-vehicle roll control

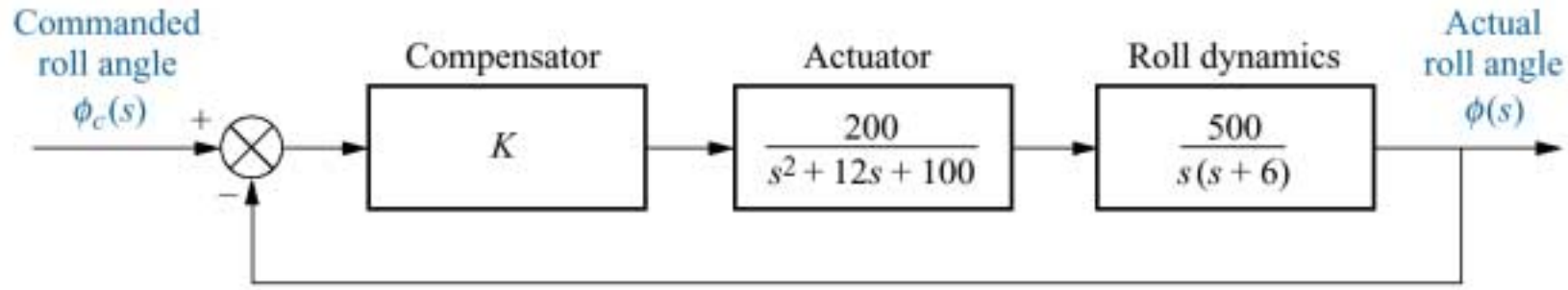


Figure P11.3

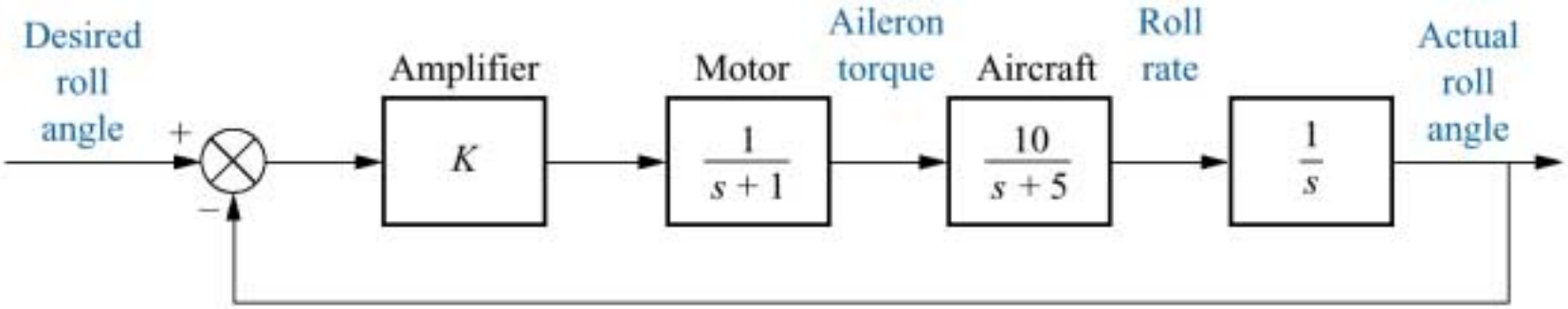


Figure P11.4
a. A self-guided vehicle;
b. simplified block diagram

Figure P11.5