ECE 441a/541a Homework 5 University of Arizona

Reading Assignments:

Shinners: Chapter 4 (Sections 4.2 and 4.3), Chapter 5 (Section 5.5), and Chapter 6 (Sections 6.2 and 6.3).

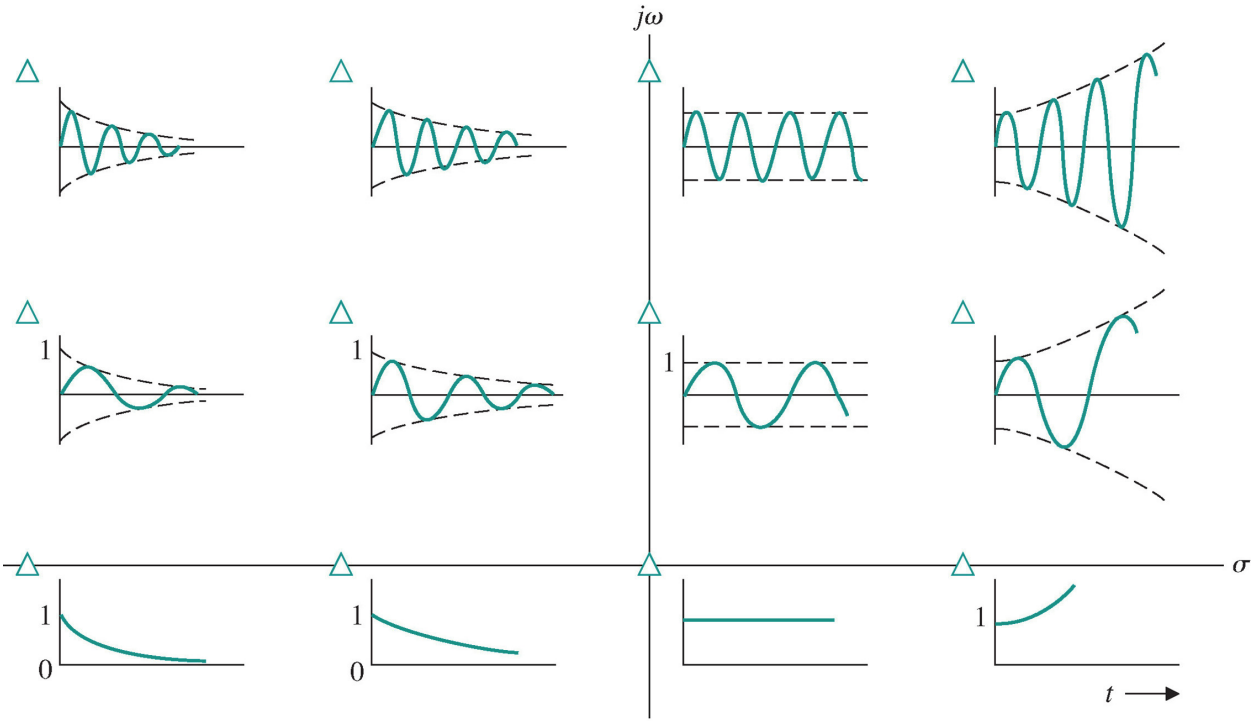
Doyle, Francis, and Tannenbaum: Chapter 3.

Please enter your answers using the D2L Quiz for Homework #5.

Note: All problems are from "Modern Control Systems," Thirteenth Edition, Richard C. Dorf and Robert H. Bishop, 2017. Problem Statements are located in a separate pdf file just below this assignment in the Unit 5 Module.

1. P5.20. Note: The error signal, E[s] = R[s] – Y[s], defined in this problem, is not the signal coming out of the summing junction.
2. CP5.3. Figure 5.17 from the Dorf & Bishop text is included on the second page of this assignment.
3. P6.1. Parts (d), (f), and (g).
4. P6.10. To examine the stability of the system in part (a), use the characteristic equation 1+G[s]H[s] = 0, which is the denominator of the closed-loop transfer function, i.e., one should examine the numerator expression of 1+G[s]H[s].
5. DP6.2.
6. CP6.2.

FIGURE 5.17 Impulse response for various root locations in the s-plane. (The conjugate root is not shown.)



"Modern Control Systems," Thirteenth Edition, Richard C. Dorf and Robert H. Bishop, 2017.

Compare with Figure 4.6 in "Modern Control System Theory and Design," Second Edition, Stanley M. Shinners, 1998.

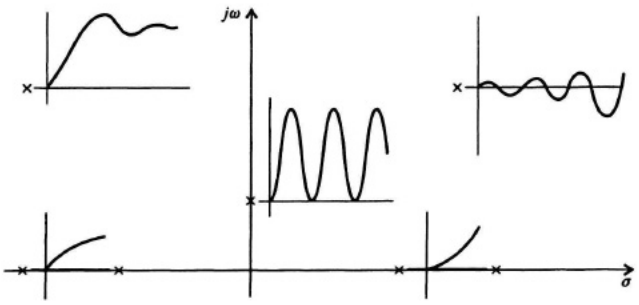


Figure 4.6 Responses of a second-order control system for various root locations in the *s*-plane (conjugate roots are not shown).