Homework 8
Due: Thursday, April 15, 2004, at 4pm

Reading OWN Chapter 9: 9.1-9.3, 9.5. 9.7.1, 9.7.2.

Practice Problems (Suggestions.) OWN 9.1, 9.2, 9.3, 9.4, 9.5

Problem 1 (Laplace transforms.) 20 Points
(a) OWN 9.21 (b)
(b) OWN 9.21 (e)

Problem 2 (Inverse Laplace transforms.) 20 Points
(a) OWN 9.22 (c)
(b) OWN 9.22 (f)

Problem 3 (Region of convergence.) 20 Points
OWN 9.23, Part 1., for all four pole/zero plots.

Problem 4 (An LTI system.) 30 Points
For a linear time-invariant system, it is known that the system function (also called transfer function) is given by

\[ H(s) = \frac{5(s - 3)}{(s + 2)(s^2 - 4s + 13)}. \]

(a) Draw the pole/zero diagram for \( H(s) \).
(b) Suppose that apart from \( H(s) \), you are also told that the system is causal. Find the corresponding impulse response \( h(t) \) of the system. Is the resulting system also stable?
(c) Suppose that apart from \( H(s) \), you are also told that the system is stable. Find the corresponding impulse response \( h(t) \) of the system. Is the resulting system also causal?

Problem 5 (A simple fact about Laplace transforms.) 10 Points
(a) OWN 9.41 (a)
(b) (Extra Credit 5 Points) OWN 9.41 (c)