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

$$H(s) = \frac{5(s-3)}{(s+2)(s^2-4s+13)}. \tag{1}$$

(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)