

ECE503 Homework Assignment Number 6

Due by 8:50pm on Monday 19-Mar-2012

IMPORTANT: Please place your ECE mailbox number on all homework assignments. Your ECE mailbox number can be found on the course web page.

Make sure your reasoning and work are clear to receive full credit for each problem. Points will be deducted for a disorderly presentation of your solution. Please also refer to the course academic honesty policies regarding collaboration on homework assignments.

1. 3 points. Mitra 8.4.
2. 4 points. Mitra 8.13 (a) and (c).
3. 3 points. Mitra 8.19.
4. 5 points. Mitra 8.33 (a)—(e). Note the implicit assumption in part (e) that the system is relaxed.
5. 6 points total. Suppose you have a system described by the difference equation

$$y[n] = \frac{1}{2}(x[n] + x[n-1]) + 0.9y[n-1]$$

- (a) 1 point. Write the transfer function for this system (including the ROC).
 - (b) 1 point. Use Matlab to plot the magnitude and phase response of this system.
 - (c) 1 point. Draw a direct form II realization of this system.
 - (d) 3 points. Compute the step response of this system given $y[-1] = 5$.
6. 2 points. Mitra 5.50 (b). Hint: The midterm exam problem 3 solution might be helpful.
 7. 2 points. Mitra 5.52 (c).