

*Please visit the course website: <http://courses.ece.uiuc.edu/ece534/fall07/index.html>*

### 3. Random Vectors and Minimum Mean Squared Error Estimation

**Assigned reading:** Chapter 3 and Section 8.6, Matrices, in the Appendix of the course notes.

**Problems to be handed in:**

3.1, 3.3, 3.5, 3.7, 3.11, 3.15, 3.17, 3.19, and 3.21 from the course notes.

- Problem 3.3: Can  $E(X|Y)$  be negative?
- Problem 3.7: You do not have to answer the question about uniqueness in part (b). The answer is non-unique; it may be useful for you to think of an example to show that the answer is non-unique, but you do not have to do it as part of the homework.
- Problem 3.19: The fact that bounded monotone sequences converge may be useful to prove (a). A monotone sequence is a sequence that is either non-increasing or non-decreasing.