Week 9
April 10–14, 2006

- **Recitation 14: Tuesday, April 11**
  - Follows L14, M Apr 10: Prediction; covariance and correlation (4.5–4.6)
  - Review the development of least squares estimators (± p. 243)
  - Problem 1: Drill problem on correlation.
  - Problem 2: Correlation coefficient.
  - Problem 3: Estimation error is uncorrelated with data.
- **Recitation 15: Thursday, April 13**
  - Follows L15, W Apr 12: Weak law of large numbers (7.1–7.3), but we are using this as a free-form review for Quiz 2. The follow-up on the topic of WLLN comes after Quiz 2.
  - A cute problem that shows a couple of ways to cleverly use conditioning is Problem 4.35:
    (a) Let $X_1, X_2, \ldots X_n$ be independent, identically distributed random variables, and let $Y = X_1 + X_2 + \cdots + X_n$. Show that
    $$\mathbf{E}[X_1 \mid Y] = \frac{Y}{n}.$$
    (b) Let X and W be independent zero-mean random variables, with positive integer variances k and m, respectively. Use the result of part (a) to find $\mathbf{E}[X \mid X + W]$.
    Hint: Think of X and W as sums of independent random variables.
- **Tutorial 8: Thursday, Friday**
  - Problem 1: Correlation
  - Problem 2: Estimation
  - Problem 3: Convergence in probability
- **Problem Set 8: Out 4/12, Due 4/26**
  - Covers 4.5–4.6 and 7.1–7.3. It is arguable that 5.1 should be covered, but I didn't want to do that because it tells the student to wait until the last two days (out of 14) to finish the problem set. The number of problems is slightly high, but some questions are very short.
  - Problem 1: Correlation (short)
  - Problem 2: Estimation (medium)
  - Problems 3 and 4: Chebyshev questions (short)
  - Problem 5: Surveying error analysis (Chebyshev) (medium)
  - Problem 6: Convergence in probability (medium)
  - Problem 7: Convergence in mean of order p (medium)
  - Grad: Detailed look at sample mean and sample variance