Stat153 Assignment 3 (due October 7, 2005)

1. **(Prediction operator)**
   Show that the prediction operator defined in lectures, $P(Y|Z) =$ the best linear predictor of Y given Z, is linear in Y:
   $$P(\alpha_1 Y_1 + \alpha_2 Y_2|Z) = \alpha_1 P(Y_1|Z) + \alpha_2 P(Y_2|Z).$$

2. **(Linear prediction)**
   Suppose that $\{X_t\}$ is an AR(1) process, we have observed X_1 and X_3, and we would like to estimate the missing value X_2. Find the best linear predictor of X_2 given X_1 and X_3.

3. **(ACF and PACF)**
   Shumway and Stoffer problem 2.8.

4. **(Forecasting an AR(2))**
   Shumway and Stoffer problem 2.12.