Due: Wednesday, May 28, 1997

Reading: Lecture Notes, Chapter 8, sections 3-5 and 7
Efron and Tibshirani, *Bootstrap*, Chapters 7 and 21.

1. Problem 11.4, page 150, Efron and Tibshirani.
2. Problem 11.10, page 151, Efron and Tibshirani.
3. Suppose that $T(F) = Var_F(X)$ so that $T_n \equiv T(I\!F_n) = n^{-1}\sum_{i=1}^n (X_i - \bar{X})^2$. Show that the jackknife estimate of the variance $\sigma_n^2(F) \equiv Var_F(T_n)$ is

$$\hat{Var} = \frac{n^2}{(n-1)^3}(\hat{\mu}_4 - \hat{\mu}_2^2)$$

where $\hat{\mu}_k \equiv n^{-1}\sum_{i=1}^n (X_i - \bar{X})^k$ for $k = 1, 2, \cdots$. Hence, assuming that $E\,X^4 < \infty$, the jackknife estimate of variance is consistent for this T:

$$n\hat{Var} \rightarrow_p \mu_4 - \mu_2^2 = \mu_2^2\{2 + \frac{\mu_4}{\mu_2^2} - 3\} = T^2(F)(2 + \gamma_2)\,.$$