Statistics 583, Problem Set 7

Wellner; 5/10/2006

Reading: Chapter 8, sections 8.4 - 8.5, pages 18 - 27;
Wasserman, Chapter 3, pages 13-41; begin reading Chapter 4
Due: Monday, May 15, 2006

1. Wasserman, example 3.10, page 29.
   (a) In the 3rd line of this example, Wasserman says that the jackknife estimate of the standard error of the skewness estimator for the nerve data is .17. Check this. (Show your code or method of calculation.)
   (b) I claimed in the solution to problem set #5, problem 4 (see page 9 of the solution set), that the estimated standard error using the delta method is .163 rather than .18 as Wasserman claimed. Check this. (Show your code or method of calculation.)
   (c) On page 31, Wasserman claims that the bootstrap based on $B = 10^3$ replications gives .16 as a bootstrap estimate of the standard error. Try it yourself to see what you get. (Show your code or method of calculation.
   The data is posted in two forms at:
   http://www.stat.washington.edu/jaw/COURSES/580s/583/sp06.probsets.html/nrvdat
   and
   http://www.stat.washington.edu/jaw/COURSES/580s/583/sp06.probsets.html/nerve.dat.

2. The expression for the jackknife variance estimator for the median, in the display (1) on page 11 (3rd line from the bottom) in chapter 8 was derived under the assumption $n = 2m$ and that $T(\mathbb{F}_n) = X_{(m)}$ if $n = 2m - 1$, $T(\mathbb{F}_n) = (X_{(m)} + X_{(m+1)})/2$ if $n = 2m$.
   (a) Derive the first equality in (1), page 11, using this definition of the sample median.
   (b) Derive versions of (2.2) using $T(F) = F^{-1}(1/2)$ (strictly). Does the asymptotic result in (1) still hold?