Statistics 523, Problem Set 1

Wellner; 3/31/99

Reading: Shorack, PfS, Chapter 13, pages 295-305; Chapter 14, pages 307-334; Williams, PwM, Chapters 16 - 18, pages 172 - 191.

Due: Wednesday, April 7, 1999.

1. Clarify the statement of Theorem 13.3.3, PfS page 294, and then prove it (Exercise 13.3.1).

2. PfS, Exercise 13.4.1, page 297. Are there comparable bounds for $x > \sqrt{2n-1}$ (with the understanding that $(1-x/n)^n = [(1-x/n)^+]^n$. In fact, show that with

$$\Delta_n \equiv \sup_{x \geq 0} |(1-x/n)^n 1_{[0,n]}(x) - e^{-x}|$$

   we have $2e^{-2} \leq n\Delta_n \leq (2+n^{-1})e^{-2}$ for all $n \geq 1$.

3. PfS, Exercise 13.4.5, page 297.

4. Find independent random variables X, Y, and Z so that Y and Z do not have the same distribution, but $X+Y$ and $X+Z$ do have the same distribution.

5. Tell me the tentative topic and title for your project and talk.