Statistics 583, Problem Set 5

Wellner; 4/29/98

Reading: Chapter 6, section 6.3; Ferguson MS, sections 5.7, and 5.9; Lehmann, TSH, Chapter 6, pages 282 - 357. Begin reading chapter 7, sections 7.1 and 7.2.
Due: Wednesday, May 6, 1998

1. Due one week from today, May 6: Tentative outlines for your talk and written projects.

2. Suppose that F is a continuous distribution function on $R^+ = (0, \infty)$, and that $X_i \sim F_i$ where $1 - F_i(x) = (1 - F(x))^{\exp(\theta z_i)}$, $i = 1, \ldots, N$ for some numbers $z_1, \ldots, z_N$ and $\theta \in R$.
   A. Find the locally most powerful rank test of $H : \theta \leq 0$ versus $K : \theta > 0$.
   B. Describe how you would cary out your test when $N = 5$ and $z_1 = z_2 = z_3 = 0$, $z_4 = z_5 = 1$.
   C. Describe how you would carry out your test when $N = 400$, $z_i = 0$ for $i = 1, \ldots, 150$, $z_i = 1$ for $i = 151, \ldots, 400$.

3. Problem #5.9.11, Ferguson, MS page 274.

4. **Optional bonus problem:** How would you approximate the power of the test you derived in 2.A?