

5/7/97

STATISTICS 583, Problem Set 6

Wellner

**Due:** Wednesday, May 13, 1997

**Reading:** Lecture Notes, Chapter 7.

Huber, *Robust Statistics*, Chapters 1 and 2;

Efron and Tibshirani, *Bootstrap*, Chapter 21, sections 1-3.

**Reminder:** Midterm Exam on Wednesday, May 13.

1. Carryover from problem set 5: For distribution functions  $F$  on  $R^+$  and  $t_0 > 0$ , consider the functional  $T(F)$  defined by

$$T(F) = \Lambda(t_0) = \int_0^{t_0} \frac{1}{1 - F_-} dF .$$

Find the influence function of  $T(F)$ .

2. Let  $T(F, G) = \int F dG = P_{F,G}(X \leq Y)$  where  $X \sim F$  and  $Y \sim G$ .
  - A. Show that  $T(F, G)$  is weakly - continuous at every pair of d.f.'s  $(F, G)$  with no common point of discontinuity. Also show that  $T(F, G)$  is continuous with respect the Kolmogorov metric  $d_K$  on distribution functions at every pair of d.f.'s  $(F, G)$ .
  - B. Extend the definition of Gateaux differentiable functions in a natural way to include  $T(F, G)$ , and then calculate the influence function of  $T(F, G)$ .