

# ON ESTIMATING SURVIVAL FUNCTIONS UNDER STOCHASTIC ORDER

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## Abstract

Let  $\bar{H}$ ,  $\bar{G}$ , and  $\bar{F}$  be survival functions satisfying the constraint  $\bar{F} \leq \bar{H} \leq \bar{G}$ . Lee, Yan, and Shi (1999) had developed an algorithm to estimate the survival function  $\bar{H}$  when  $\bar{F}$  and  $\bar{G}$  are known. However, lacking a closed form of the estimator makes the investigations of the properties of the estimators difficult. In this paper, we propose alternative estimators for  $\bar{H}$  in the case where  $\bar{F}$  and  $\bar{G}$  are known. However, lacking a closed form of the estimator makes the investigations of the properties of the estimator difficult. In this paper we propose alternative estimators for  $\bar{H}$  in the case where  $\bar{F}$  and  $\bar{G}$  are known and in the case where they are unknown. The estimators are proved to be strongly uniformly consistent in both cases: the formulas for the bias and the mean squared error (MSE) are also derived. In the simulations the MSE of our estimators, when  $\bar{F}$  and  $\bar{G}$  are known, are uniformly better than that of Lee, Yan, and Shi when the sample size is small (30): when the sample size is large, further investigation is needed.