



Nonparametric prediction intervals for future order statistics in a proportional hazard model

M. Razmkhah* and Jafar Ahmadi

Department of Statistics, Ordered and Spatial Data Center of Excellence,
Ferdowsi University of Mashhad, P. O. Box 91775-1159, Mashhad, Iran

Abstract

Consider k independent random samples with different sample sizes such that the i th sample comes from the cumulative distribution function (cdf) $F_i = 1 - (1 - F)^{\alpha_i}$, where α_i is a known positive constant and F is an absolutely continuous cdf. Also, suppose that we have observed the maximum and minimum of the first k samples. This paper shows how one can construct the nonparametric prediction intervals for the order statistics of the future samples on the basis of these information. Three schemes are studied and in each case exact expressions for the prediction coefficients of prediction intervals are derived. Numerical computations are given for illustrating the results. Also a comparison study is done while the complete samples are available.

Keywords Prediction intervals; Multisampling plan; Order statistics; Extremes; Proportional hazard model.

Mathematics Subject Classification Primary 62M20; Secondary 62G30, 62G15.

1 Introduction and some preliminaries

Prediction of future events becomes a problem of great interest. Parametric and nonparametric predictions have been considered in the literature. In many practical data-analytic situations we are interested in using the observations from an initial sample to construct an interval containing some statistics of the future sample of observations from the same underlying distribution. This problem has been considered by several authors in the context of ordered data. See for example, Lawless (1977), Nagaraja (1984, 1995), Kaminsky

*Corresponding author.

E-mail addresses: razmkhah_m@um.ac.ir (M. Razmkhah) and ahmadi-j@um.ac.ir (Jafar Ahmadi).