

Nonparametric inference for sequential k -out-of- n systems

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Abstract The k -out-of- n model is commonly used in reliability theory. In this model the failure of any component of the system does not influence the components still at work. Sequential k -out-of- n systems have been introduced as an extension of k -out-of- n systems where the failure of some component of the system may influence the remaining ones. We consider nonparametric estimation of the cumulative hazard function, the reliability function and the quantile function of sequential k -out-of- n systems. Furthermore, nonparametric hypothesis testing for sequential k -out-of- n -systems is examined. We make use of counting processes to show strong consistency and weak convergence of the estimators and to derive the asymptotic distribution of the test statistics.

Keywords Sequential k -out-of- n systems · Nonparametric estimation · Nonparametric hypothesis testing · Nelson–Aalen estimator · Martingale methods