

ON THE APPLICATION OF THE THEORY OF COUNTING PROCESSES IN THE
STATISTICAL ANALYSIS OF CENSORED SURVIVAL DATA

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0. SUMMARY

It was demonstrated by Aalen (1978) how the theory of multivariate counting processes gives a general framework in which both censored survival data and inhomogeneous Markov processes may be analyzed, and how by means of martingale central limit theory the asymptotic distribution for all the classical linear nonparametric two-sample tests and their generalizations to censored data may be derived. In this paper these results will be surveyed and further developed to both the case of the comparison of $k(>2)$ distributions (see Andersen, Borgan, Gill & Keiding, 1981) and to the case of regression models for survival data (Cox, 1972; Andersen & Gill, 1981).

1. Introduction

In survival analysis one is interested in the distribution of the time T to some event, usually denoted death, and very often the object of a study is to relate this distribution to individual characteristics which in the simplest form are group indicators. Frequently statistical models for survival data are specified via the intensity or hazard function $\alpha(t)$ for T . The hazard function denotes the infinitesimal probability of dying at time t given survival up to time t , and hence $\alpha(t)$ may be interpreted as the rate at which the event in question occurs at time t .