ONLINE ISSN : 1348-6365
PRINT ISSN : 1882-2754

JOURNAL OF THE JAPAN STATISTICAL SOCIETY
Vol. 34 (2004) , No. 2 pp.153-172

Unbiased Estimation of Functionals Under Random Censorship

Akio Suzukawa[1)]

1) Graduate School of Economics and Business Administration, Hokkaido University

Abstract: This paper is intended as an investigation of estimating functionals of a lifetime distribution F under right censorship. Functionals given by $\int \varphi dF$, where φ's are known F-integrable functions, are considered. The nonparametric maximum likelihood estimator of F is given by the Kaplan-Meier (KM) estimator F_n, where n is sample size. A natural estimator of $\int \varphi dF$ is a KM integral, $\int \varphi dF_n$. However, it is known that KM integrals have serious biases for unbounded φ's. A representation of the KM integral in terms of the KM estimator of a censoring distribution is obtained. The representation may be useful not only to calculate the KM integral but also to characterize the KM integral from a point view of the censoring distribution and the biasedness. A class of unbiased estimators under the condition that the censoring distribution is known is considered, and the estimators are compared.

Key words: Censored data, Kaplan-Meier estimator, mean lifetime, product-limit estimator, survival data