

Title: Empirical Evaluation of Estimators Associated with the Mean Residual Life Function

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Degree: Master of Statistics

Date: March 2008

Abstract:

The mean residual life (MRL) function has already gained its popularity in the analysis of survival data for the past decades. It is defined as the remaining life expectancy of a subject given its survival up to time  $t$ . Both its advantages and scope of application have been elucidated in numerous studies. In this research, the asymptotic unbiasedness and MSE consistency of the Kaplan-Meier analogue of the empirical MRL function and two estimators of the rate of change of the MRL function were characterized using Markov Chain Monte Carlo (MCMC) simulation but restricted on the distributional assumptions for the survival times. Censored observations were incorporated in the data which range from 0% to 50% of the sample having an increment of 5%. As a result, the Kaplan-Meier analogue of the empirical MRL function was found to be a biased estimator but MSE consistent. The two estimators of the rate of change of the MRL function were both biased estimator and not MSE consistent. Censoring impedes the Kaplan-Meier analogue of the Empirical MRL function to have the properties of Asymptotic unbiasedness and MSE consistency. However, the amount of censoring generally does not affect the performance of the two estimators of the rate of change of the MRL function.

Keywords and phrases: mean residual life function, survival analysis, Kaplan-Meier analogue of the empirical MRL function, Markov Chain Monte Carlo simulation, censoring