Inference for the Accelerated Failure Time (AFT) Model Under Type II Censoring

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Abstract:

In this study, we obtain the estimators of the parameters in the accelerated failure time (AFT) model, Wei (1992), under type II censoring, Chan et al. (2008), when the distribution of the error terms is skew normal (SN). See Azzalini (1985) and Balay (2014) in the context of SN distribution and AFT model, respectively.

In the estimation procedure, we use the well known maximum likelihood (ML) methodology. However, we cannot obtain the analytical solutions of the likelihood equations because of the nonlinear functions. We, therefore resort to iterative methods. Here, we use iteratively reweighting algorithm (IRA) which is vey popular in robustness studies to solve the likelihood equations. We also use a modified version of ML methodology initiated by Tiku (1967,1968) which is a non iterative method to obtain the explicit estimators of the unknown model parameters.

Finally, we use an extensive Monte Carlo simulation study to compare the efficiencies of the estimators obtained by using the ML and the MML methodologies. At the end of the study, we analyzed a simulated data to present the implementations of the methodologies given in the study.

References

A. Azzalini (1985). A class of distributions which includes the normal ones. *Scand. Journal of Statistics*, Vol. 12, 171-178.

İ. G. Balay (2010). *Robust Parameter Estimation for the Life-Stress Models and the Accelerated Failure Time Model Under Skew Distributions* (Ph.D. Thesis). Ankara University, Turkey.

L. J. Wei (1992). The accelerated failure time model: a useful alternative to the Cox regression model in survival analysis. *Statistics in Medicine*, Vol. 11, 1871-1879.

M. L. Tiku (1967). Estimating the mean and standard deviation from censored normal sample. *Biometrika*, 54, 155-165.

M. L. Tiku (1968). Estimating the parameters of normal and logistic distributions from censored samples. *Austral. J. Statist.*, 10, 64-74.

P. S. Chan, H. T. Ng, N. Balakrishnan and Q. Zhou (2008).Point and interval estimation for extreme-value regression model Type-II censoring.*Computational Statistics and Data Analysis*, Vol. 52, 4040-4058.