

## Bayesian estimation for Poisson process models with grouped data and covariate

### ABSTRACT

This paper looks into the Bayesian approach for analyzing and selecting the best Poisson process model for grouped failure data from a repairable system with covariate. The extended powerlaw model with a recurrence rate that incorporates both time and covariate effect is compared to the powerlaw, log-linear and HPP models. We propose the use of both informative and noninformative priors depending on the nature of the parameter. The MCMC technique is utilized to obtain samples from the posterior distribution which was implemented via WinBUGS. We then apply the Bayesian Deviance Information Criteria (DIC) to select the best model for real data from ball bearing failures where information regarding previous failures are available. The credible interval is used to check the significance of the parameters of the selected model. We also used the posterior predictive distribution for model checking by comparing the observed and posterior predictive mean number of failures.

**Keyword:** Bayesian; Poisson process.