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BAYESIAN ESTIMATION OF POISSON-COMPOUNDED EXPONENTIAL TYPE DISTRIBUTION UNDER DIFFERENT LOSS FUNCTIONS

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Abstract

Poisson moment exponential distribution is an important distribution and has gained special attention recently. It plays role in various fields, mostly in actuarial sciences. Thus its parametric estimation becomes important thing to do. The classical approach using the maximum likelihood method is the most used way to estimate the parameters of a distribution. In this paper, we considered the Bayesian approach to estimate the parameter of the distribution using beta prior which is a conjugate prior. The Bayes estimate for the parameter is obtained under Squared Error Loss Function (SELF) which is a symmetric loss function, Weighted SELF (WSELF) and Entropy Loss Function (ELF). Through a simulation study, the comparison is made on the performance of Bayes estimate under these loss functions with respect to Bias and Mean Square Error (MSE).

Keywords: Bayesian, Loss function, Maximum likelihood estimator, Poisson moment exponential distribution, Simulation

1. Introduction

Bayesian statistics is still one of the most potent concepts in the opinion of many statisticians. Even years after Thomas Bayes first proposed the idea of the Bayes theorem in 1770, the significance of Bayesian statistics has not diminished. In Bayesian statistics, the unknown parameter is considered as the value of a random variable from a specified probability distribution with some prior knowledge about the parameter. Researchers, engineers, statisticians, and other applied scientists who utilise prediction techniques for a variety of objectives find it highly intriguing to estimate the lifespan of future samples based on an informative sample. One-sample and two-sample prediction problems, which are a particular form of the multiple-sample prediction issue, are the two categories into which the future prediction problem falls.

The application of Bayesian approaches in many statistical and non-statistical domains is gaining popularity. In 2020, Johannesson [12] proposed that at any rate, there is a disagreement between classical statistics and the Bayesian theory.

There are several benefits of Bayesian approaches over Frequentistic approach, few among them are listed as under:

- By adjusting prior distribution, Bayesian inference can prevent problems with model identification. Since frequentist inference lacks prior distributions, so it can lead to problems with model identification when employing any numerical approximation approach.