# Estimation of the Parameters of the Lomax Distribution using the EM Algorithm and Lindley Approximation

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**Extended Abstract** 

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### Introduction

In the analysis of life-testing data which is studied in many fields of applied statistics and medical studies, due to the lack of insufficient financial resources and/or time limitations, the censored data are considered. There are different types of censoring schemes. In this study, type-II censored is used. In this method, the test is continued until the occurrence of the  $r^{th}$  failure time. The number of failure units (r) is predetermined. Also, the estimation parameter of distribution is one of the important discussions in statistical inference. In this paper, the parameters of Lomax distribution under the censored of the second type data can be estimated using the EM algorithm and the Lindley approximation.

The Lomax distribution is applicable in economics, trade, statistical science, queuing theory, Internet traffic modeling and etc.

## Material and methods

In statistical inference, choosing prior distributions and loss functions plays an important role in the Bayesian estimation. The maximum likelihood estimation and Bayesian estimation of the parameters of Lomax distribution is obtained under type-II censored data. The Bayesian estimation is presented by using of appropriate prior distribution under the mean square error, Linex and entropy loss functions. In the process of estimation, the normal equations obtained from the estimation methods are not explicit functions of the parameters. So the parameters are estimated by using the EM algorithm and the Lindley approximation.

#### **Results and discussion**

To compare the estimators, samples with different sizes and different number of failure units are generated using R software. The estimation of parameters and mean square error of them are obtained.

#### Conclusion

- The results show that Bayesian estimate is better than the maximum likelihood estimator.
- It can be seen that the accuracy of the estimator increases by increasing sample size while the number of failures is constant.

**Keywords:** EM algorithm; Lindley approximation, Lomax distribution, censored data, Estimation methods, Mean squared error.

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