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STATISTICAL INFERENCE STUDY ON SOME CONTINUOUS DISTRIBUTIONS BASED ON CENSORED SAMPLES

A Thesis Submitted to

Mathematics Department, the Faculty of Science, Al-Azhar University

For the Partial Fulfillment of the Requirements for the Master Degree of Science- Mathematics

(Mathematical statistics)

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2019

Summary

Lifetime testing plays an important role in industry and in many other fields, and due to the high cost and the long time that both the lifetime tests cons-ume, statisticians developed different types of censored samples , where the experimenter can terminate the experiment before all units are failed. There are many different types of censoring schemes, such as the conve-ntional Type-I and Type-II censoring, the progressive censoring and many different types of censoring schemes will be discussed in the coming cha-pters. The main aim of this thesis is to develop the methods of estimation and prediction to make a statistical inference for the exponential form and the inverse exponential form of distributions, suggested by Mohie El-Din et al.(2011), with general conjugate exponential prior based on different types of censored samples.

This thesis is divided into five chapters:

Chapter 1:

In this chapter, we give a brief introduction to the basic concepts and definitions of statistical inference, exponential and inverse exponential forms. Also, an overview is introduced for different types of censored samples.

Chapter 2:

In this chapter, we obtain the maximum likelihood (ML) and Bayesian estimators for the parameters of exponential form distributions based on progressive Type-I hybrid censored samples. The one-sample Bayesian prediction has been constructed. We also derive a general procedure of the two-sample Bayesian prediction when an unobserved future sample is progressively Type-II censored from the same distribution. The Pareto distribution is presented as special cases from the exponential form.

Finally, numerical results for the Pareto distribution are presented for illustr-ating all the inferential methods discussed here.

Chapter 3:

In this chapter, an exponential form of the underlying distribution and a gen-eral conjugate prior are used to discuss the maximum likelihood and Bayes-ian estimation using three different loss functions based on an generalized Type-II progressive hybrid censored sample. A general procedure of the on-

e sample Bayesian prediction for the failure times of all units that are removed in all stages of censoring is derived from a generalized Type-II progressive hybrid censored date from the same sample is discussed as well as that from an unobserved future sample is also developed. The Weibull, Burr-XII and Pareto distributions are presented as special cases from the exponential form. Finally, all the proposed estimators and prediction methods have been compared using Monte carlo simulation and real example.

Chapter 4:

In this chapter, we use the left Type-II censored data to obtain the maximum likelihood and Bayesian estimators of the parameters of the inverse ex-ponential forms with general conjugate exponential prior. Also, we construct a two-sample Bayesian prediction. We present the results for the inverse exponential and inverse Rayleigh distribution as illustrative examples. Finally, we present some numerical results for illustrating all the inferential meth-ods developed here.

Chapter 5:

In this Chapter, we make some concluding remarks and also suggest some ideas and problems that could lead to future research.