Abstract

In distribution theory, the mixture of discrete distributions is an important class of distributions which gives more flexibility than the simple basic distributions. In this investigation an attempt has been made to study on mixture of certain discrete probability distributions. Size-biased, zero-modified and zero-truncated form of some generalized Poisson-Lindley and quasi Poisson-Lindley distributions have been studied. Some properties including recurrence relations for probabilities, factorial moments and cumulants have also been studied. For estimating the parameters of the distributions, several methods of estimation have been considered. A few sets of reported data have been considered for the fitting of the distributions, and the goodness of fits is compared with that of other distribution for empirical comparison.

The thesis consists of eight chapters. The first chapter is an introductory one which gives an account of the relevant works done earlier on different types of finite, continuous and countable mixture of distributions. The second chapter concerned with a review on some properties and application of size-biased Poisson-Lindley distribution (Ghitany and Al-Mutairi, 2008). In the succeeding chapter, an attempts have been made for deriving certain recursion formulae involving probabilities, factorial moments and cumulants of new form of size-biased Poisson-Lindley (Adhikari and Srivastava, 2013) and Poisson size-biased Lindley (Adhikari and Srivastava, 2014) distributions. The Zero-modified Poisson-Lindley distribution has been discussed to serve the probabilistic description of some experimental published data with slight modification of probability at zero in chapter 4. In chapter 5, generalized Poisson-Lindley distribution is revisited to obtain certain distributional properties of the distribution. The two-parameter quasi Poisson-Lindley distribution has been considered along with its applications in chapter 6. A comparative study has been made on Zero-truncated Poisson-Lindley and quasi Poisson Lindley distributions in chapter 7. In chapter 8, some properties of the Poisson size-biased quasi Lindley distribution have been studied.

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