Abstract

The theory of discrete probability distribution is considered as a useful branch in statistics, having its applications in a wide variety of disciplines. In this thesis, an attempt has been made to study on some finite and countable mixtures of discrete probability distributions. In recent years, the mixture distributions have drawn continuous attention since the traditional models such as Poisson, Negative binomial, Geometric etc. which can be formulated on the basis of simple models, have found to be inadequate in situations which occur in number of phenomena.

The thesis comprises of seven chapters. The first chapter is an introductory one and is devoted to various techniques of mixture distributions that have been studied in this thesis. It also gives an account of the relevant works done earlier by different authors. The second chapter is based on new quasi Poisson-Lindley which is obtained by compounding Poisson distribution with that of Lindley distribution. Different properties of the distribution have been studied including the probability recurrence relation and factorial moment recurrence relation. The parameters are estimated by considering the method of moment. In the third chapter we have obtained the size-biased version of new quasi Poisson-Lindley distribution. The shape of the probability function has been shown graphically. The probability generating function and factorial moment generating function has also been obtained. Parameters are estimated by considering the first two moments and the method of maximum likelihood. The fourth chapter is concerned with a review on generalized two-parameter Poisson-Lindley distribution which was obtained by Shanker and Mishra (2013). Statistical properties like the shape of the probability function, skewness, kurtosis and Index of dispersion are obtained. The expressions for recurrence relation for probabilities and factorial moment recurrence relation have been obtained. The parameters by obtained by the method of moment. In the fifth chapter, we have made a comparative study on zero-truncated Poisson-Lindley, zero-truncated new generalized Poisson-Lindley and zero-truncated generalized two-parameter Poisson-Lindley. Different recurrence relations of the distributions have been obtained. The parameters are obtained by the method of maximum likelihood. A new discrete mixture distribution named Poisson-Sushila distribution is obtained by compounding

Poisson distribution with that of Lindley distribution has been obtained in chapter 6. The parameters are obtained by the method of moments. In the last chapter i.e in chapter 7, we have studied on some properties of Poisson size biased new quasi-Lindley distribution and studied certain properties.