J. KSIAM Vol.13, No.1, 55-72, 2009

MISCLASSIFICATION IN SIZE-BIASED MODIFIED POWER SERIES DISTRIBUTION AND ITS APPLICATIONS

ANWAR HASSAN[1†] AND PEER BILAL AHMAD[2]

[1] DEPARTMENT OF STATISTICS, UNIVERSITY OF KASHMIR, SRINAGAR, INDIA
E-MAIL address: anwar.hassan2007@gmail.com, anwar_hassan2007@hotmail.com

[2]DEPARTMENT OF STATISTICS, UNIVERSITY OF KASHMIR, SRINAGAR, INDIA
E-MAIL address: peerbilal@yahoo.co.in

ABSTRACT. A misclassified size-biased modified power series distribution (MSBMPSD) where some of the observations corresponding to x = c + 1 are misclassified as x = c with probability α, is defined. We obtain its recurrence relations among the raw moments, the central moments and the factorial moments. Discussion of the effect of the misclassification on the variance is considered. To illustrate the situation under consideration some of its particular cases like the size-biased generalized negative binomial (SBGNB), the size-biased generalized Poisson (SBGP) and size-biased Borel distributions are included. Finally, an example is presented for the size-biased generalized Poisson distribution to illustrate the results.

1. INTRODUCTION

In certain experimental investigations involving discrete distributions external factors may induce a measurement error in the form of misclassification. For instance, a situation may arise where certain values are erroneously reported; such a situation termed as modified or misclassified has been studied by Cohen ([1],[2],[3] for the Poisson and the binomial random variables, Jani and Shah [4] for modified power series distribution (MPSD) where some of the value of one are sometimes reported as zero, and recently by Patel and Patel ([5], [6]) incase of generalized power series distribution (GPSD) and MPSD for a more general situation where sometimes the value (c +1) is reported erroneously as c.

Cohen [2] altered data from Bortkiewicz's [7] classical example on deaths from the kick of a horse in the Prussian Army, to illustrate the practical application of his results. He assumed that twenty of 200 given records which should have shown one death were in error by reporting no deaths. The same example was considered by Williford and Bingham [8].

In this paper we are concerned with the situation where sometimes the value (c +1) is reported erroneously as c in relation to size-biased MPSD. As we know, weighted distributions arise when the observations generated from a stochastic process are not given equal chance of being recorded; instead, they are recorded according to some weight function.

Received by the editors August 2 2008; Accepted in revised form March 15 2009.
2000 *Mathematics Subject Classification*. 62E15
Key words and phrases. Misclassification, size biased, modified power series distribution, raw moments, central moments, factorial moments, variance ratio, inverted parabola, generalized Poisson, generalized negative binomial, Borel distribution.

† Corresponding author.