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ON TESTING FOR THE NUMBER OF COMPONENTS IN A MIXED POISSON MODEL

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Abstract. Poisson mixtures are usually used to describe overdispersed data. Finite Poisson mixtures are used in many practical situations where often it is of interest to determine the number of components in the mixture. Identifying how many components comprise a mixture remains a difficult problem. The likelihood ratio test (LRT) is a general statistical procedure to use. Unfortunately, a number of specific problems arise and the classical theory fails to hold. In this paper a new procedure is proposed that is based on testing whether a new component can be added to a finite Poisson mixture which eventually leads to the number of components in the mixture. It is a sequential testing procedure based on the well known LRT that utilises a resampling technique to construct the distribution of the test statistic. The application of the procedure to real data reveals some interesting features of the distribution of the test statistic.

Key words and phrases: Poisson mixture, k-finite mixture, number of components, likelihood ratio test, resampling.