

Random partitioning over a sparse contingency table

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Abstract The present article investigates a class of random partitioning distributions of a positive integer. This class is called the limiting conditional compound poisson (LCCP) distribution and characterized by the law of small numbers. Accordingly the LCCP distribution explains the limiting behavior of counts on a sparse contingency table by the frequencies of frequencies. The LCCP distribution is constructed via some combinations of conditioning and limiting, and this view reveals that the LCCP distribution is a subclass of several known classes that depend on a Bell polynomial. It follows that the limiting behavior of a Bell polynomial provides new asymptotics for a sparse contingency table. Also the Neyman Type A distribution and the Thomas distribution are revisited as the basis of the sparsity.

Keywords Discrete multivariate distribution · Infinitely divisible · Size index · Statistical disclosure control · Species abundance