

Approximation of sums of conditionally independent variables by the translated Poisson distribution

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It is shown that the sum of a Poisson and an independent approximately normally distributed integer-valued random variable can be well approximated in total variation by a translated Poisson distribution, and further that a mixed translated Poisson distribution is close to a mixed translated Poisson distribution with the same random shift but fixed variance. Using these two results, a general approach is then presented for the approximation of sums of integer-valued random variables, having some conditional independence structure, by a translated Poisson distribution. We illustrate the method by means of two examples. The proofs are mainly based on Stein's method for distributional approximation.

Keywords: Stein's method; total variation metric; translated Poisson distribution