

Stein's method for compound Poisson approximation via immigration-death processes

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24 July, 2003

Abstract

In dependent systems, rare events have a tendency to appear in clusters which make Poisson distribution a less favourable model as approximation errors are too large to use. For such situations, a compound Poisson distribution seems to be a more suitable choice. Stein's method for compound Poisson approximation was introduced in Barbour, Chen and Loh (1992) but the approach is useful only when the approximating distribution $Z = \sum_{j=1}^{\infty} jN_j$, with $N_j \sim \text{Poisson}(\lambda_j)$ satisfies $j\lambda_j \downarrow 0$ as $j \rightarrow \infty$. In this paper, we present a framework of Stein's method using immigration-death processes with multiple deaths, and some

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