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A Generalization of the Pólya Process

Krasimira Y. Kostadinova[1], Leda D. Minkova[2]

[1]*Faculty of Mathematics and Informatics, Shumen University "K. Preslavsky"*
Shumen, Bulgaria
kostadinova@shu.bg

[2]*Faculty of Mathematics and Informatics, Sofia University "St. Kliment Ohridski"*
5, J. Bourchier Blvd, 1164 Sofia, Bulgaria
leda@fmi.uni-sofia.bg

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In this paper we define a bivariate counting process as a compound negative binomial process with bivariate geometric compounding distribution. The resulting process is called a Bivariate compound Pólya process. The probability mass function and some properties are given. The marginal distributions of the defined process are compound Pólya distributions with geometric compounding distribution. Then we consider a bivariate risk model in which the claim counting process is a Bivariate compound Pólya process. We also consider two types of ruin probability for this risk model and find the corresponding Laplace transforms. We discuss in detail the particular case of exponentially distributed claims.

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