
Stochastic Modeling by a Convolution of the Type Exponential–Lindley

Abba Mallam HASSAN

Université Abdou MOUMOUNI, Niger. lachimer2@gmail.com

In this study, we focus on a convolution of exponential–Lindley type. Specifically, we have sought to express a gamma-distributed random variable as the sum of an exponentially distributed variable and a Lindley-distributed random variable. Subsequently, we propose an approach to model a phenomenon that can be decomposed into two other independent phenomena. This could be useful in survival analysis or reliability theory, hydrology or climatology, and other fields. We have also studied certain conditional properties of the model that ensure its applicability. Furthermore, we have proposed two approaches based on the maximum likelihood method for estimating the model parameters. Each approach is implemented through simulations.

References

1. C. Chesneau, L. Tomy and J. Gillariose (2020b), *On sum an difference of two Lindley distributions: theory and application*, Revstat–Statistical Journal, 18(5), 673–695. doi:10.57805/revstat.v18i5.326.
2. D. V. Lindley (1957), *Fiducial distributions and Baye's Theorem*, Statistical Laboratory, Cambridge, no. 1, 1958, 102–107.
3. G. Sitek, *Sum of normal and gamma distribution*, Scientific Papers of Silesian University of Technology, Organisation and Management Series, no. 143, 2020.
4. L. Pierrat and G. d'Aubigny (2014), *Somme de lois gamma différentes et détermination des paramètres d'une distribution gamma équivalente*.
5. M. Kitani, H. Murakami and H. Hashiguchi, *Distribution of the sum of gamma mixture random variables*, SUT Journal of Mathematics, vol. 60, no. 1, 2024, 17–37.