

- [Published: 16 May 2019](#)

# The Topp–Leone Lomax (TLLo) Distribution with Applications to Airbone Communication Transceiver Dataset

- [Pelumi E. Oguntunde](#),
- [Mundher A. Khaleel](#),
- [Hilary I. Okagbue](#) &
- [Oluwole A. Odetunmibi](#)

[Wireless Personal Communications](#) **volume 109**, pages349–360 (2019)[Cite this article](#)

- **256** Accesses
- **5** Citations
- [Metricsdetails](#)

## Abstract

The Lomax distribution was extended in this paper using the Topp–Leone family of distributions. Some of its specific structural properties were established and the model parameters were estimated using maximum likelihood estimation method. The usefulness of the Topp–Leone Lomax distribution was demonstrated using an airborne communication transceiver dataset and comparison were made with respect to the Topp–Leone Burr XII, Topp–Leone Flexible Weibull and Lomax distributions.

This is a preview of subscription content, [access via your institution](#).

**Access options**  
**Buy single article**

Instant access to the full article PDF.

34,95 €

Tax calculation will be finalised during checkout.

Buy article PDF

### Subscribe to journal

Immediate online access to all issues from 2019. Subscription will auto renew annually.

111,21 €

Tax calculation will be finalised during checkout.

Buy journal subscription

[Rent this article via DeepDyve.](#)

[Learn more about Institutional subscriptions](#)

## References

---

1. 1.

---

Abbas, S., Taqi, S. A., Mustapha, F., Murtaza, M., & Shahbaz, M. Q. (2017). Topp–Leone inverse Weibull distribution: Theory and application. *European Journal of Pure and Applied Mathematics*, 10(5), 1005–1022.

[MathSciNet](#) [MATH](#) [Google Scholar](#)

---

2. 2.

---

Al-Shomrani, A., Arif, O., Shawky, A., Hanif, S., & Shahbaz, M. Q. (2016). Topp–Leone family of distributions: Some properties and application. *Pakistan Journal of Statistics and Operation Research*, 12(3), 443–451.

[MathSciNet](#) [Article](#) [Google Scholar](#)

---

3. 3.

---

Aryal, G. R., Ortega, E. M., Hamedani, G., & Yousof, H. M. (2016). The Topp–Leone generated Weibull distribution: Regression model, characterizations and applications. *International Journal of Statistics and Probability*, 6, 126.

[Article](#) [Google Scholar](#)

---

4. 4.

---

Bayoud, H. A. (2016). Estimating the shape parameter of Topp–Leone distribution based on progressive type II censored samples. *REVSTAT-Statistical Journal*, 14(4), 415–431.

[MathSciNet](#) [MATH](#) [Google Scholar](#)

---

5. 5.

---

Brito, E., Cordeiro, G. M., Yousof, H. M., Alizadeh, M., & Silva, G. O. (2017). The Topp–Leone odd log-logistic family of distributions. *Journal of Statistical Computation and Simulation*, 87(15), 3040–3058.

[MathSciNet](#) [Article](#) [Google Scholar](#)

---

6. 6.

---

Feroze, N., & Aslam, M. (2013). N Bayesian Analysis of failure rate under Topp Leone distribution using complete and censored samples. *International Journal of Mathematical, Computational, Physical, Electrical and Computer Engineering*, 7(3), 426–432.

[Google Scholar](#)

---

7. 7.

---

Genc, A. (2012). Moments of order statistics of Topp–Leone distribution. *Statistical Papers*, 53(1), 117–131.

[MathSciNet Article](#) [Google Scholar](#)

---

8. 8.

---

Jorgensen, B. (1982). *Statistical properties of the generalized inverse Gaussian distribution*. New York: Springer.

[Book](#) [Google Scholar](#)

---

9. 9.

---

Merovci, F., Khaleel, M. A., Ibrahim, N. A., & Shitan, M. (2016). The beta type X distribution: Properties with applications. *SpringerPlus*, 5, 697.

[Article](#) [Google Scholar](#)

---

10.10.

---

MirMostafaei, S. M. T. K. (2014). On the moments of order statistics coming from the Topp–Leone distribution. *Statistics and Probability Letters*, 95, 85–91.

[MathSciNet Article](#) [Google Scholar](#)

---

11.11.

---

MirMostafaei, S. M. T. K., Mahdizadeh, M., & Aminzadeh, M. (2016). Bayesian inference for the Topp–Leone distribution based on lower k-record values. *Japan Journal of Industrial and Applied Mathematics*, 33(3), 637–669.

[MathSciNet Article](#) [Google Scholar](#)

---

12.12.

---

Oguntunde, P. E., Adejumo, A. O., Okagbue, H. I., & Rastogi, M. K. (2016). Statistical properties and applications of a new Lindley exponential distribution. *Gazi University Journal of Science*, 29(4), 831–838.

[Google Scholar](#)

---

13.13.

---

Oguntunde P. E., Khaleel M. A., Ahmed M. T., Adejumo A. O., & Odetunmibi O. A. (2017). A new generalization of the Lomax distribution with increasing, decreasing and constant failure rate. *Modelling and Simulation in Engineering*, Article ID: 6043169, 6.

---

14.14.

---

Owoloko, E. A., Oguntunde, P. E., & Adejumo, A. O. (2015). Performance rating of the transmuted exponential distribution: An analytical approach. *SpringerPlus*, 4, 818.

[Article Google Scholar](#)

---

15.15.

---

Pourdarvish, A., Mirmostafae, S. M. T. K., & Naderi, K. (2015). The exponentiated Topp–Leone distribution: Properties and application. *Journal of Applied Environmental and Biological Sciences*, 5(7S), 251–256.

[Google Scholar](#)

---

16.16.

---

Reyad, H. M., & Othman, S. A. (2017). The Topp–Leone Burr XII distribution: Properties and applications. *British Journal of Mathematics and Computer Science*, 21(5), 1–15.

[Article Google Scholar](#)

---

17.17.

---

Sangsanit, Y., & Bodhisuwan, W. (2016). The Topp-Leone generator of distributions: properties and inferences. *Songklanakarin Journal of Science and Technology*, 38(5), 537–548.

[Google Scholar](#)

---

18.18.

---

Sultan, H., & Ahmad, S. P. (2016). Bayesian analysis of Topp–Leone distribution under different loss functions and different priors. *Journal of Statistics Application and Probability Letters*, 3(3), 109–118.

[Article Google Scholar](#)

---

19.19.

---

Topp, C. W., & Leone, F. C. (1955). A family of J-shaped frequency functions. *Journal of the American Statistical Association*, 50(269), 209–219.

[MathSciNet Article Google Scholar](#)

---

20.20.

---

Yousouf, H. M., Alizadeh, M., Jahanshahi, S. M. A., Ramires, T. G., Ghosh, I., & Hamedani, G. G. (2017). The transmuted Topp–Leone G family of

distributions: Theory, characterizations and applications. *Journal of Data Science*, 15, 723–740.

[Google Scholar](#)

---

[Download references](#)

---

## Acknowledgements

The authors are grateful to the anonymous reviewers for their useful comments and to Covenant University, Nigeria for providing an enabling environment for this research.

---

## Author information

### Affiliations

- 1. Department of Mathematics, Covenant University, Ota, Nigeria**  
Pelumi E. Oguntunde, Hilary I. Okagbue & Oluwole A. Odetunmibi
- 2. Department of Mathematics, Faculty of Computer Science and Mathematics, University of Tikrit, Tikrit, Iraq**  
Mundher A. Khaleel

Corresponding author

Correspondence to [Pelumi E. Oguntunde](#).

---

## Additional information

### Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

---

## Rights and permissions

[Reprints and Permissions](#)

---

## About this article

### Cite this article

Oguntunde, P.E., Khaleel, M.A., Okagbue, H.I. *et al.* The Topp–Leone Lomax (TLLo) Distribution with Applications to Airbone Communication Transceiver

Dataset. *Wireless Pers Commun* **109**, 349–360 (2019).  
<https://doi.org/10.1007/s11277-019-06568-8>

[Download citation](#)

- Published 16 May 2019
- Issue Date November 2019
- DOI <https://doi.org/10.1007/s11277-019-06568-8>

Keywords

Not affiliated

[Springer Nature](#)

© 2021 Springer Nature Switzerland AG. Part of [Springer Nature](#).