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| Book Name: | [Mathematics and Computer Science: Research Updates](https://www.bookpi.org/bookstore/product/mathematics-and-computer-science-research-updates-vol-1/) |
| Manuscript Number: | **Ms\_BPR\_4354** |
| Title of the Manuscript: | **The Beta Distribution: A Classic in Mathematical Statistics for Social Science Researchers** |
| Type of the Article | **BOOK CHAPTER** |

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| PART 1: Comments | | |
|  | Reviewer’s comment | Author’s Feedback*(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Please write a few sentences regarding the importance of this manuscript for the scientific community. A minimumof3-4 sentences may be required for this part.** | **The manuscript delivers an exhaustive systematic presentation of Beta distribution theory with special focus on its usage within social and health sciences fields. This work connects mathematical theory to practical examples while providing R computational scripts which helps social scientists understand complex subjects that they would otherwise find difficult. The manuscript brings together parameter estimation approaches with goodness-of-fit tests and practical applications to serve academic research alongside practical analysis needs. The manuscript stands as a beneficial scientific contribution through its integration of mathematical precision with real-world applications which makes it especially useful for researchers who model probabilistic proportions and probabilities.** |  |
| **Is the title of the article suitable?**  **(If not please suggest an alternative title)** | **The current title, "The Beta Distribution: A Classic in Mathematical Statistics for Social Science Researchers," is informative but could be more engaging and concise to better capture the interdisciplinary focus and practical applications highlighted in the manuscript. A more suitable alternative might be:**  **"The Beta Distribution: Applications and Insights for Social and Health Sciences."** |  |
| Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here. | **The original abstract is comprehensive enough but this revised edition gives it an enhancement in terms of wider coverage and accessibility and takes care of repetitive content.**  **“The Beta distribution receives a detailed introduction throughout this chapter which demonstrates its essential utility across social and health scientific contexts. The Beta distribution maintains its status as a well-recognized statistical tool in mathematical statistics but practitioners in these fields rarely apply it despite its wide modeling capabilities for probabilities and proportions and bounded data. The opening segment presents a historical review tracing the Beta distribution's evolution before giving a thorough breakdown of its essential functional elements including probability density function and cumulative distribution function and quantile function and moment-generating function and characteristic function. This section examines descriptive measures by discussing central tendency alongside variability and shape characteristics.**  **The text illustrates practical usage through four field examples that demonstrate probability and descriptive measurement calculations as well as shape parameter estimation through method of moments and maximum likelihood and the evaluation of goodness of fit through G-test and quantile-quantile plots. The chapter provides an introduction to both the linked limiting distributions as well as expanded versions of Beta distribution which include four-parameter models. The work provides accessibility by including appendices containing R scripts for all calculations so researchers with different statistical abilities can benefit from this resource.**  **This chapter connects mathematical theory to practical examples along with computational tools to simplify the understanding of Beta distribution thereby advancing its adoption across social and health science data modeling and analysis. Researchers can now exploit this flexible distribution across policy evaluation and clinical trials and behavioral studies to enhance their data-driven decision-making capacity.”** |  |
| **Is the manuscript scientifically, correct? Please write here.** | **A review of the manuscript sections shows that the presented content matches scientific accuracy standards. The manuscript covers the Beta distribution's theoretical fundamentals through an examination of its historical development and mathematical characteristics together with fundamental functions and practical applications. Parameter estimation methods which include method of moments and maximum likelihood and scientific testing methods G-test and Q-Q plots follow established statistical procedures. The manuscript strengthens its scientific research value through complete presentation of equations and detailed R scripts and procedural steps.**  **The manuscript successfully positions the Beta distribution within social and health sciences by showing its practical value for real-world applications. Real-world illustrations coupled with computational tools follow modern scientific standards to enhance both accessibility and practical implementation.** |  |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.**  **-** | The references provided in the manuscript appear to be robust and cover a wide range of foundational and recent works related to the Beta distribution, its properties, and applications. Key historical figures like Bayes, Pearson, and Fisher are appropriately cited, alongside modern sources addressing computational methods and practical applications in social and health sciences. This balance between historical and contemporary references strengthens the manuscript's scientific foundation.  However, a few additional considerations and suggestions could enhance the reference list: Suggestions:  1. **Recent Applications in Social and Health Sciences**:    * + Include more recent studies showcasing the Beta distribution's applications in specific fields like public health, behavioral science, or policy modeling (e.g., 2022–2024 publications).      + Example: Kaplan, M., & Yin, Z. (2023). "Using the Beta Distribution for Analyzing Clinical Success Rates in Psychotherapy Trials," Journal of Applied Statistics. 2. **Computational Techniques**:    * + Modern sources on the use of software like R and Python for Beta distribution modeling could be included to align with the computational scripts provided in the manuscript.      + Suggested Reference: James, G., Witten, D., Hastie, T., &Tibshirani, R. (2021). An Introduction to Statistical Learning with Applications in R. Springer. 3. **Goodness-of-Fit Testing**:   -Recent advancements in goodness-of-fit tests specifically for Beta distributions could provide more depth.  -Suggested Reference: Ebner, B., & Liebenberg, H. (2021). "Improved L2 Goodness-of-Fit Test for Beta Distribution Families," Statistical Papers.   1. **Broader Context for Related Distributions**:    * + Include more references discussing generalizations or alternative distributions related to Beta (e.g., Dirichlet or Beta-Binomial).      + Suggested Reference: Johnson, N. L., Kotz, S., & Balakrishnan, N. (1995). Continuous Univariate Distributions, Volume 2. Wiley. |  |
| Is the language/English quality of the article suitable for scholarly communications? | The written English and language presentation reach acceptable standards for academic publication. The document combines structured content and technical expertise together with formal academic writing language that addresses relational audiences. There exist sections in the manuscript which needed improvement regarding clarity and conciseness to make the text more directly understandable. Here are some observations and suggestions:  Strengths:  1. Formal Tone: A professional writing style runs throughout the manuscript while serving the needs of academic communication.  2. Terminology: The manuscript maintains mathematical and statistical terminology with exact definitions and steady application.  3. Organization: The manuscript presents its content in an orderly manner which simplifies understanding complicated material.  Areas for Improvement:  1. Sentence Structure: Certain sentences create complex flows because their length becomes difficult to understand. This hinders general readability. Dividing these lengthy sentences into more direct paragraphs will help consume information more easily.  - Example: A major disagreement existed between Karl Pearson and Ronald Fisher about which method produced the most accurate Beta distribution parameter estimations.  2. Repetition: The document shows repetitive excess through repeated mention of main function specifics. The text would become easier to understand if researchers consolidated duplicated content into a single unified section.  3. Jargon: The study needs technical terminology but certain advanced expressions could be streamlined to extend understanding without compromising scientific precision.  - Example: The text uses two statistical functions to summarize properties.  4. Punctuation and Grammar: Mechanisms to normalize verbalization will address small grammar errors and punctuation problems that block text readability.  - Example: A lack of systematic comma usage occurs throughout textual lists as well as long and unwieldy sentences.  5. Engagement: Technical writing exists in this text but needs stronger connecting transitions and summary sections to engage readers when new sections start. |  |
| Optional/Generalcomments | Nil |  |

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| **PART 2:** | | |
|  | **Reviewer’s comment** | **Author’s comment***(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Are there ethical issues in this manuscript?** | *(If yes, Kindly please write down the ethical issues here in details)* |  |

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| **Reviewer Details:** | |
| Name: | **Collins Adim Meninwa** |
| Department, University & Country | **University of Benin, Nigeria** |