|  |  |
| --- | --- |
| Journal Name: | [**Asian Research Journal of Mathematics**](https://journalarjom.com/index.php/ARJOM) |
| Manuscript Number: | **Ms\_ARJOM\_131972** |
| Title of the Manuscript: | **Second Type of Second Order Slope Rotatable Designs utilizing Balanced Incomplete Block Designs** |
| Type of the Article | **Original Research Article** |

|  |  |  |
| --- | --- | --- |
| **PART 1: Comments** | | |
|  | **Reviewer’s comment**  **Artificial Intelligence (AI) generated or assisted review comments are strictly prohibited during peer review.** | **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 minimum of 3-4 sentences may be required for this part.** | **This manuscript presents a significant advancement in response surface methodology by proposing a second type of second order slope rotatable design (SOSRD) utilizing Balanced Incomplete Block Designs (BIBD). The proposed designs, especially for 7, 9, and 13 factors, require fewer design points than those derived from central composite designs (CCD), which can lead to more efficient experimental setups. The research contributes to optimizing experimental designs, which is essential for researchers and practitioners working in statistical modeling and design of experiments.** | Yes |
| **Is the title of the article suitable?**  **(If not please suggest an alternative title)** | **The title is suitable and accurately reflects the content of the manuscript.** | Yes. However, we made a minor modifications in the title of the paper as “Second Order Slope Rotatable Designs of Second Type utilizing Balanced Incomplete Block Designs” |
| **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 abstract is comprehensive, but you might consider briefly emphasizing the real-world implications of reducing design points, as this strengthens the practical relevance of the research.** | The real world implications of reducing design points is that the cost of the experiment may be reduced. |
| **Is the manuscript scientifically, correct? Please write here.** | The manuscript is scientifically sound and presents robust mathematical derivations. The conditions for SOSRD are well stated, and the theorem is supported with detailed proof and an example. | Yes |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.** | The references are adequate and recent, with proper citations to foundational and contemporary research. No immediate additions are necessary. | Yes, however as per the suggestions of the editor and another reviewer some more additional references are included in the revised version of the paper. |
| **Is the language/English quality of the article suitable for scholarly communications?** | The language is suitable for scholarly communication, but a final proofreading pass is recommended to catch minor grammatical inconsistencies (e.g., article usage in a few places). | The suggestions of the referee are incorporated in the revised version of the paper. |
| **Optional/General** comments | **The inclusion of illustrative examples and the appendix tables strengthens the manuscript. However, adding a discussion section elaborating on potential limitations or future extensions of the method could enhance the manuscript's impact.** | Discussion:  In this study, we suggest SOSRD of second type utilizing BIBD. It is found that in some cases this suggested method leads to SOSRD of second type with fewer number of design points compared to SOSRD of second type utilizing CCD of Kim and Ko, Ravikumar and Victorbabu, PBD of Ravikumar and Victorbabu, SUBA with two unequal block sizes of Ravikumar and Victorbabu and BIBD with unequal block sizes of Ravikumar and Victorbabu. Specifically for v=7 factors the new design needs 85 design points whereas corresponding SOSRD of second type utilizing CCD need 93 design points and BIBD with unequal block sizes need 127 design points. Similarly for v=9 factors the new design needs 133 design points whereas corresponding SOSRD of second type utilizing CCD need 165 design points, PBD need 213 design points, SUBA with two unequal block sizes need 181 design points and BIBD with unequal block sizes need 199 design points, For v=13 factors the new design needs 261 design points whereas corresponding SOSRD of second type utilizing CCD need 309 design points, PBD need 565 design points. Further, for v=3, 4, 5 and 11 factors these new design needs 25, 41, 61 and 221 design points where as corresponding SOSRD of second type using BIBD with unequal block sizes need 31, 49, 71 and 353 design points respectively. For v=8 and 12 factors these new design needs 145 and 401 design points where as corresponding SOSRD of second type using PBD need 273 and 561 design points respectively.  The work is in progress to study some new methods of SOSRD of second type to reduce the number of design points. |

|  |  |  |
| --- | --- | --- |
| **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)* | No |