Review of: "Symmetric Key generation And Tree Construction in Cryptosystem based on Pythagorean and Reciprocal Pythagorean Triples"

Shaima Safa aldin Baha Aldin[1]

1 Al Nahrain University

Potential competing interests: No potential competing interests to declare.

The paper presents a new scheme for symmetric key generation based on Pythagorean and Reciprocal Pythagorean triple that incorporates a Key Distribution Centre (KDC) for user authentication and the secure exchange of secret information to generate keys. It is an interesting paper, but there are some points that authors should concern with:

1. The system procedures are not well defined, so I suggest to draw a system model to describe how does the system work.
2. The abstract section should be rewritten. For example, the first line gives an introduction to the cryptosystem, the second line the well know issues and potentials regarding this system. The third line presents the suggested work and the last lines present the obtained improvements regarding your work as an outline conclusion. Also, the keywords are missing.
3. Each used equation should be written in a single line with its number that is mentioned inside the paragraphs, such as

   Z= X+ Y ..... (1)

   Refer to equation (1).

4. Rewrite the introduction section. The introduction section should firstly introduce you to the cryptography system, some different algorithms used other than yours in such a system, why you chose this specific technique regarding other techniques, and at the end of the introduction section you should write your contribution in this work and how the paper is organized. I suggest to utilize the following papers for introducing other techniques (6D Hyperchaotic, Fibbonachi Q-Matrix) in generating key for a Crypto system and then introduce your technique:

- S. Sun, "A New Image Encryption Scheme Based on 6D Hyperchaotic System and Random Signal Insertion," in IEEE Access, vol. 11, pp. 66009-66016, 2023, doi: 10.1109/ACCESS.2023.3290915.
- Aldin, S.S.a.B., Aykaç, M. & Aldin, N.B. Quad-color image encryption based on Chaos and Fibonacci Q-matrix. Multimed Tools Appl (2023). https://doi.org/10.1007/s11042-023-15958-x

5. Refer to other articles to see how they mention the references in the introduction section. Use no more 2 references in each section and at the end of it.
6. Compare your proposed methods with some latest related works, and put it in a section titled 'related works'

7. The English of this manuscript is not very hard to follow, but some proper improvements in grammar and syntax as well as spellings which should be carefully corrected in order to be more professional.
8. The main work should listed before the results and the results are not enough such as computing the robustness of generated key against different attacks and so on.
9. I suggest to replace the C# programming codes with eithrt pseudo codes or Flowchart for better demonstration.
10. Refer to the used tables or figures in the related section with a little demonstration or conclusion.
11. The conclusion section is poorly written and should be polished to better summarize the whole content. There should not be no notations or demonstrations in the conclusion section, but a summary for the proposed work and its outstanding results in comparison to latest related works.
12. The mentioned references should be appropriately revised according to one of the widely known referencing styles such MPA or IEEE style.

Due to the above, major improvements on logics and arguments are required before it can be accepted.