Review of: "A Quantitative Analysis of Co-occurrence Matrices in Ecological Systems: Measuring Connectance and Entropy"

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Potential competing interests: No potential competing interests to declare.

The proposed method is mathematically sound, but the paper falls short in connecting the theory to real-world ecological systems. To enhance the impact of this work, empirical validation with real data, improved ecological interpretation, and a clearer comparison with existing models are needed. Addressing the limitations and providing accessible tools for application will make the study more relevant and useful to ecologists. Before accepting the paper, the authors should address the following comments:

1. The paper emphasizes the mathematical development but lacks sufficient ecological context. The separation of entropy into diagonal and triangular components (H(D) and H(T)) is not fully explained in biological terms, leaving the ecological relevance unclear. Therefore, the authors have to provide more ecological examples to demonstrate how these measures of entropy and negentropy reflect species interactions or ecosystem properties. Explain the biological significance of H(D) vs. H(T).
2. Although the paper compares its entropy measure with Ricotta and Szeidl's model, the practical advantages of the proposed method are not fully established. It is unclear when or why the new method should be preferred. Conduct a more detailed comparison between your method and existing models, particularly in applied contexts. Highlight specific scenarios where your method outperforms others or offers new insights into ecological complexity.
3. The paper does not sufficiently address potential limitations of the method, such as how it handles sparse data or systems with incomplete connectivity. A discussion on the assumptions behind the model is also absent. Include a discussion of the model's limitations, especially in terms of data structure, matrix size, and sparsity. Outline any assumptions and consider their implications for different ecological datasets.
4. Tables 1-5 and Figures 1 and 2 need to be professionally redesigned. Currently, they appear as if they were cropped and pasted from another source, such as Excel, which diminishes the quality. Ensure that tables are created within the document using consistent formatting, and figures are redrawn using high-resolution, vector-based tools for clarity and professionalism. Avoid using cropped images or screenshots.