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Peer Review

Review of: "On Optimal Linear Prediction"

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A Reviewer Report for the manuscript: “On Optimal Linear Prediction”

Author: Inge S. Helland

The article discusses optimal methods in linear prediction. The optimality is formulated based on the mean square prediction error (MSPE). It synthesizes ideas from mathematical statistics, chemometricians algorithms, and quantum theory. The author links model reduction and optimal predictors to the statistical framework for PLS regression and incorporates quantum mechanical techniques to establish optimality proofs.

The paper is a good contribution to PLS regression’s theoretical underpinnings, showing its optimality under specific conditions. It also explores connections between quantum mechanics and statistical modeling, which is a relatively unexplored area.

Recommendation

Major Revision: The paper is mathematically rigorous and addresses a novel intersection of fields. However, it requires additional effort to make the content more accessible, practical, and engaging for a broader audience. Simulations or empirical validations would also strengthen the work.

Areas of Improvement

1. Merge all of the previous results stated in this manuscript in one section named “Preliminary Results" after the introduction section.

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2. Use subsections as much as possible to reduce the number of sections.
3. Simplify the quantum mechanics discussion or provide an appendix explaining key concepts for a wider audience.
4. Add numerical simulations or applications to demonstrate the theoretical findings' practical implications attached with suitable algorithm(s).
5. Add numerical simulations to demonstrate the theoretical findings' practical implications.
6. Include more examples to illustrate abstract concepts.
7. Provide illustrative figures or tables, which could help clarify complex mathematical arguments.
8. Including simulation studies or real-world examples would enhance the paper's impact and practical relevance.
9. The paper references include several references for the author, which should be complemented with independent studies for balance.
10. In Equation (20), Page 7, there is a missing part in the middle term.
11. Why are Pages not numbered?
12. The manuscript should be well presented, e.g., justifying the paragraphs.

Attachments: available at https://doi.org/10.32388/Y4KZIL

Declarations

Potential competing interests: No potential competing interests to declare.