Peer review

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Contents

This report provides a peer review of the work conducted by Candice Pascaud and Matyas Rodriguez Szonyi on analyzing the resistive behavior of an inductance box. Their findings reveal that the resistance of certain inductance pairs did not conform to standard combination laws. Our goal is to offer feedback and constructive criticism regarding the clarity of the report, as well as their methodology and the conclusions drawn from this experiment.

1 Clarity and Organization

The introduction and the mind map were both well written and properly presented the subject. It is nice to present the statistical model part in a "step-by-step" manner. The different figures showing the experimental space were especially nice. It would just have been nice to have slightly more development about the importance of the VIF and its meaning. However, including the relative error of the models as proof that the model is correct was particularly well thought.

The theoretical model part was straight forward and is well explained, and it was especially pertinent when showed alongside the statistical model in the "link between model" section. Seeing how you related the theoretical calculation to the weights calculated using MSE really helped to see how those two were related. There is a slight discrepancy in between figure 7 and the equations for the first theoretical model, specifically equations 2 and 3, where (1, 0) should go with equation 2 and (0, 1) should go with equation 3.

The inadequacy of the non-interacting model was made evident by evaluating the variance function, which was then confirmed empirically through measurements.

2 Methodology

It was nice to see proof that some resistances are additive and some are not. Also, using the relative error as an argument for whether the statistical model is correct or not was smart. Starting with the simplest model (non-interacting) to prove that it is invalid, before adding to the model (interacting), was the appropriate method.

3 Data and Assumptions

You should have included the measurement errors of your resistances at least once. Even if they are insignificant, they are still important for reviewers to check the validity of the results.

4 Analysis of the Results

D was not given standardized. This could have given some more information about the model. The values of the VIF are not explained more than the definition. For example : Why is the VIF of a_0 of table 1 is different then a_1 and a_2? The VIF of table 3 is not normalized. Because of it, it gives the impression that the model is not great. However the standardized VIF is 1 which is coherent because the system is entirely solvable so the model will exactly predict the value, hence coherent that VIF is 1.

Figures 4 and 6 showing the variance functions was interesting, however it may be good to further develop the analysis of those graphs.

It would have been great to see discussions about limits of both theoretical and statistical models. What are they good for? Are they complementary? When is one preferable to the

other ? etc...

It is good that you give a clear mathematical link between theoretical and empirical models in section 5, but perhaps it would also be good to direct the reader's attention to tables 5 and 6, which would allow one to confirm these equations by themselves.

5 Global feedback

Great clarity of explanations and good thinking about proof of your models. The "Link between model" part was good. You should think about adding the measurements errors for reviewers as well as the standardized dispersion matrix. Both also help validate the models to check if errors and hence practical variance is not too big. Some sentences can be rewritten for the sake of clarity and there are some English mistakes, however these are just details.

Overall this is a great report.