

Peer Review

Review of: "Parameter Calibration for Johnson Cook and Preston-Tonks-Wallace Material Strength Models with Uncertainty Quantification"

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The authors apply a system identification method using a Variational Bayesian Method. Specifically, they apply the method to determine the parameters of the Johnson-Cook material strength model and the parameters in the Preston-Tonks-Wallace material strength model. The approach provides an estimate of the most probable value of the model parameters; i.e., based on experimental data, the approximation for the posterior distribution of the model parameters is obtained.

Whilst the case study for both the Johnson-Cook model and the Preston-Tonks-Wallace model shows good approximation to the experimental results, there are two areas that need further discussion:

1. A better fit to the experimental data does not necessarily imply a good model. This is evident in the authors' own admittance that "... The additive parameter, A, went down by three orders of magnitude ...". The parameter A is related to the yield strength of the material; therefore, an explanation is needed as to why such a low value occurred?
2. The uncertainty measures are not clearly defined. Is, for example, an uncertainty of 1.4% a tolerance for the estimated parameter? Please expand on the definition and estimation of the uncertainties (specifically, how they are determined and what they mean).

How were the correlations (Figures 2 & 7) among the parameters determined, specifically, what method was used to estimate the correlations?

The posterior correlation matrix for the Johnson-Cook model parameters is given; please could you provide the relevant posterior correlation matrices for the Preston-Tonks-Wallace model parameters?

The references and citations are quite comprehensive; however, the way that the Variational Bayesian Method (VBM) has been adapted for the chosen application needs a more comprehensive description. The section on Bayesian Calibration should contain a mathematical explanation/description of the VBM.

It is not clear which dissimilarity measure was used to infer that the posterior distribution minimised such a dissimilarity measure.

In my opinion, with additional details describing the method and the additional points given above, the article could be heading to a rating of 5 stars!

Declarations

Potential competing interests: No potential competing interests to declare.