Answers to reviewer 2

Our answers to your comments and the corresponding modifications in the article are in blue.

The work proposes an improved version of the tensor train approximation for parametric estimation considering a nonlinear elasto-viscoplastic constitutive law as a case study.

The manuscript is very well written, complete and rigorous and is of interest for the audience of MDPI. Accordingly, I recommend the manuscript for publication listing below minor amendments.

In the introduction, when motivating the importance of the study, Authors should discuss the wide literature and audience dealing with biological tissues and biomechanics in particular. Here, recent contributions have tried to set a state-of-the-art in constitutive modeling and parameters identifications from both a theoretical and computational point of view (see e.g. Gilchrist et al. 2017 https://doi.org/10.1007/s11012-017-0646-9, Saccomandi & Vergori 2018, Marino 2018 https://doi.org/10.1007/s10237-018-1009-8 and DOI: 10.1016/B978-0-12-801238-3.99926-4).

🎉 We understand the suggestion you make about discussing the wide literature in the field of biological tissues and biomechanics. However, those are fields that we are not acquainted with and we believe that it might mislead the reader on the core purpose of this article. Finally, the concern of surrogate modeling is actually addressed in many fields and our intent is not to try to be exhaustive about this matter but rather introduce one working method in the field of mechanical science.

Again in the introduction, I would suggest the Authors discuss in terms of “nonlinearity” other than “complexity”.

🎉 We have modified the introduction as suggested.

Is the tensor-train related to the mechanical multiplicative decomposition (see Spencer)? Since the Authors take a well-established mechanical model it could be interesting for the readers setting such a link.

🎉 The multiplicative decomposition in mechanics aims at splitting the deformation gradient into an elastic part and a plastic part. This is not the purpose of the tensor-train decomposition. No tensor carriage can be considered as either solely elastic or solely plastic.

Please, reshape Figure 1. It is not understandable in its present form.

🎉 We changed the figure and modified the caption for better understanding.

Please, in the discussion section, summarise the most important contribution of the work.

🎉 We added a summary of the most important contribution at the beginning of the section.

What happens if the truncation tolerance is lowered?

🎉 As explained in line 217, the lower the tolerance the smaller the approximation errors.

What happens if parameters are randomly selected from a different distribution other than “uniform law”?

🎉 The random selection of entries during the training phase remains an open issue. It deserves more research.
“Effectivity” needs to be better introduced.

➔ We modified (above line 230) the way the notion of effectivity is introduced.

In Tab. A1 it is not clear the physical dimension $s^{-n}$

➔ We added a remark in the corresponding caption.

What about if a different applied strain is considered?

➔ For the sake of simplicity, the loading condition was not treated as an input parameter in the article. It is not an intrinsic limitation of the proposed methodology. On the other hand, we must acknowledge that the ability of this method to consider a very large number of parameters (20 or more) was not considered in the present work.

When entering \linenumbers with the equation is necessary to set \linenomath before and after in order to avoid numbering breaking.

➔ We thank you for the tip. The line numbering has been fixed accordingly.

➔ We thank you for your valuable comments and the time dedicated to reviewing the article.