Dear Editor,

Thank you for carefully reviewing our work and for your comments. We have tried to address them, and we believe the paper is now improved thanks to your suggestions. We will look forward to your feedback should you have additional comments, and we will be happy to address them.

Emmanuel and Jens

Now the paper's focus is clearer. However, the title, abstract, introduction and presentation suggest you are proposing a contribution in multibody dynamics, which is not the case. What you are proposing may represent a contribution within control systems. It may have some educational value as well. Both aspects are very important nowadays. Therefore, I recommend to reformulate the title, abstract and introduction of the paper to make transparent the goal and possible contributions.

- Based on your comment we have now reformulated the title to the following: "A symbolic framework to obtain mid-fidelity models of flexible multibody systems with application to horizontal-axis wind turbines"
- We have also modified the abstract and the introduction to stress the fact that our work focuses on symbolic calculation, and mid-fidelity models compared to what is possible with more advanced nonlinear dynamics treatment of the problem.

After reviewing carefully, the revised version of the paper titled "A symbolic framework for flexible multibody system applied to horizontal axis wind turbines", I have the following comments:

- Page 2: Added text is not precise. The key point regarding the geometrically exact beam model (GEBM) is that the kinematics is exactly represented, i.e., R^3 x SO(3) or SE(3). It has nothing to do with nonlinear shape functions. Moreover, the linearization of GEBM is typically computed straightforwardly as well. This is nothing else than a standard procedure in implicit dynamics.
  - Thank you for your comment, we have modified the sentence as follows: "The geometrically exact beam theory is more precise than the shape function approach because it represents the beam kinematics exactly. Linearization of the geometrical exact beam theory equations is possible and also more precise than the shape function approach but it leads to larger and more involved expressions."
- Pages 9, 10 and 11: The geometric stiffness matrix is not complete. Adopting a floating frame of reference and assuming that the beam is initially aligned with the third unit vector of such a floating frame, the terms that are missing are the proportional ones to v_1 *omega_2, -omega_1*v_2, - d/dt v_3 and g_3. For instance, if the attachment of the blade/tower is moving back-and-forth and side-to-side and under action of gravity, all the missing terms are going to be activated. Whether they are small or large is another question. Those terms need to be accounted for to provide a consistent linearization. Blade or tower, the structure of the geometrical stiffness matrix should be the same.
  - We agree with your statement. We have added the following sentences to the section regarding the blade: "In this example, the beam rotates with respect to a fixed support, the influence of gravity is omitted and no force other than the centrifugal force is assumed in the radial direction (the Coriolis force contribution to the radial force is assumed to be negligible for simplicity). Therefore, the only geometrical stiffening comes from the centrifugal force.

For a wind turbine blade mounted on a flexible support and under the influence of gravity, the different geometrical stiffening terms presented in Appendix C should be used. "

- In the tower example, we have added a similar sentence: "The tower is assumed to be fixed and under no significant vertical external loads and therefore the only geometrical stiffness comes from the gravitational force. For a tower mounted on a moving support (fixed-bottom foundation or floater), additional geometrical stiffening terms would be present (see Appendix C)."
- The terms - d/dt v_3 and g_3 are accounted for by term K_gt,alpha presented equation C2. In this appendix though, and to your point, we do not have the impact of the Coriolis force on the geometrical stiffening. We believe that in the approach of Schwertassek and Wallrapp, this term was neglected as it was considered to be of second order, though they never explicitly mention the Coriolis force when they discuss geometric stiffening. The term can be considered of second-order because it contains a "q"x"qdot" term (it is a stiffening or damping term). Yet, we agree that this the term might not be insignificant if the steady state deflections are large. We have added some comments and expressions in Appendix C to address this issue.

- Page 18: Claims regarding the linearization are again imprecise or even misleading. Analytical linearization is indeed possible and a usual practice in multibody dynamics. What is not trivial is the reduction of the model due to the fact that the dynamics lives on a nonlinear manifold. I do not see how you can provide different levels of details for instance without considering multiscale analysis in time and space… You should elaborate more on this.
  - We agree that two slightly different nonlinear systems may lead to completely different responses, and obtaining reduced-order models is not trivial, and it’s a topic where we are not well versed. We have added the following sentences to attempt to address the topic: "The shape function approach is an approximate method: it introduces a separation of space and time early on in the development of the nonlinear equations of motion, and applies low order polynomial (usually linear or quadratic) approximations to eliminate high-order terms (see e.g. Table 1 of Wallrapp,1994). This was presented as an advantage in Section 5.1 because the equations are obtained in compact form and are readily linearized. The approximations introduced by the method may imply that nonlinearities are not well captured, which is why the models are labeled as “mid-fidelity” throughout this article. The domain of validity of the nonlinear or linear models presented may therefore be limited in time and space as opposed to fully nonlinear models. Advanced methods to obtain high-fidelity reduced-order models from nonlinear dynamic systems are beyond the scope of this work, see, e.g. Steindl:2001, Benner:2015, Touze:2021."