

The manuscript presents the setup of a novel reduced-order model (ROM) for capturing the nonlinear dynamic behavior of wind turbine rotor blades, which is very relevant as the blades get longer and longer in the recent wind turbine designs and the geometric nonlinearities gain increased influence.

Still, this reviewer has some comments and questions regarding the procedure and the results, which is why some clarifications should be made before the paper can be accepted for publication.

- Figures 1a and 1b are not sufficiently introduced in the text. 1a shows the 6 MW turbine you mention in line 35f? 1b – why did you include this picture/what kind of damage is shown?
- Line 40: Can you give more information regarding the statement “fatigue has become the leading cause of blade failure”? Does this refer mainly to longer blades? Maybe give an indication for the length of the blades in the referred studies?
→ I believe this is an interesting point in your introduction that you can elaborate on more. Because, as I understand it, due to your high-fidelity ROM capturing the nonlinear dynamics more accurate, fatigue calculations can potentially also be more accurate in the end.
- Line 125: “prescribed angular velocity” means constant rotor speed in this context, correct? As far as I understand it, a constant rotation is only defined for some test cases? Maybe you can find a way to connect these statements.
- General comment: In my opinion, you can introduce the figures in more detail and with more description within the text. This would put more emphasis on the figures.
- If you have, a photograph of the actual experimental setup of the CX-100 would be a nice addition to Fig. 6.
- Regarding the results given in Table 5: Please give more details regarding the extraction of the modal properties from the experimental data. What kind of OMA method was utilized? What kind of sensors were used? In Table 3 you state “piezoelectric transducer”, but it is unclear what physical quantity was actually measured? How did you conduct the mode matching between the experimentally obtained modes and the simulated ones?
- Is the measurement data and/or the material and geometric properties of the CX-100 openly accessible?
- Do you believe the number of modes that should be included to approximate the nonlinear frequency response (cf. Fig. 9) is very specific to the NREL 5 MW blade or is this representative and can be adapted more generally? Maybe you can also include this in the discussion?
- Can you give some indication about the actual computing times of the simulations using Sharpy, FOM, ROM, LTI?

Some additional (minor) comments

- Line 48: Qu et al.
- Line 49: Wang et al.
- Statement in line 103 (“vibration modes ... cannot be obtained analytically ...”) is a bit strong, I believe there are studies that attempt to calculate the first vibration modes of wind turbine blades analytically.
- The title of Table 7 e.g. has a full stop and others have not – please be consistent.