

Wind Energ. Sci. Discuss., referee comment RC1
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Comment on wes-2022-109

Anonymous Referee #1

Referee comment on "Damping analysis of floating offshore wind turbines (FOWTs): a new control strategy reducing the platform vibrations" by Matteo Capaldo and Paul Mella, Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2022-109-RC1>, 2023

The paper addresses feedback control of Floating Wind Turbines (FWTs). It investigates the appearances of zeros on the right hand-side (NMPZ) in the transfer dynamics from blade pitch angle to rotor speed and from blade pitch angle to the platform pitch angle. It proposes an analytical model to tune controller gains, which control rotor speed but also platform pitch motion. Load results by OpenFAST of a 15MW FWT are shown, fatigue damage of blade bearings and tower-base is calculated.

The illustration of the effect of the NMPZs is very nice. The analytical control design model is well explained but not new. The tuning procedure uses assumptions, which significantly simplify the level of coupling in FWT dynamics. The results are still significant, although they should be compared to another approach including a platform pitch damping (i.e. the existing procedure of ROSCO including platform pitch damping), not to a controller without platform pitch damping. It would be beneficial to check if the NMPZ is really compensated by the control approach. Robustness of the controller against instability is not quantified.

A few characteristic features are not sufficiently explained, like the calculation of the generator torque compensation. Without this feature, the proposed controller is very comparable to ROSCO.

Variables should be explained thoroughly and text and captions written in a way for easier readability (use text rather than symbols, only).

References to other work are acceptable. Still, there is more relevant literature on tuning controllers at every wind speed, which is above the rated wind speed. These should be included in the introduction.

Please also note the supplement to this comment:

<https://wes.copernicus.org/preprints/wes-2022-109/wes-2022-109-RC1-supplement.pdf>