Wind Energ. Sci. Discuss., referee comment RC2
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Comment on wes-2022-86

Anonymous Referee #2

Referee comment on "Platform yaw drift in upwind floating wind turbines with single-point-mooring system and its mitigation by individual pitch control" by Iñaki Sandua-Fernández et al., Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2022-86-RC2, 2022

Overall:

- This article presents the yaw motion-related challenges of using a single-point mooring configuration for a floating wind turbine and a controller to mitigate the effects. A high level of detail was presented to show the effect of each blade on the yaw moment, but very little information was provided about the controller and design trade-offs of SPM, which would have strengthened the paper. The ability to use IPC for yaw positioning is already known, but more information about its control authority, in general, would have been a nice contribution.

Abstract

- This is a great abstract; it's clear and concise and I have a good idea of what the paper is about.

Introduction

- Please also mention that yaw misalignment is very important for power capture. This should be the primary goal of a yaw control system and one of the main drawbacks of an SPM system.
- L28: please cite where a free-yawing structure has been shown to reduce structural loads and be more specific about which loads are reduced.
- L48: what is an important yaw response?
- L50: please revise this sentence. Although [a] SPM configuration helps to improve the…

Figure 3:

- I recommend using plain English in your legends and describing each case in the caption, so a reader can quickly search for results in the figures and captions.
- I think that Figs 3 and 4 are very similar and could be shown side by side for a more interesting result.

Figs 5 and 6:

- Please describe why it is important to look at each blade's individual contribution. These rose plots are not typical in wind energy papers, so some guidance on how to interpret them would be helpful to the reader.
- What information is this adding, compared to Figs. 3 and 4?

Section 4 (Controller):

- What are the parameters of the low pass filter? PID gains? More parameters make it easier to repeat the study.
- How were the gains tuned? Does the result change with wind speed?

Section 6:

- The fact that it works is great, but the comparison shown (especially generator speed/power) is not quantitative. Is there a trade-off between IPC effort (tilt and yaw pitch angle) and yaw regulation/generator power? Near rated, where IPC costs power, is there some optimal effort vs. yaw regulation? Pitch actuation effort can be quantified with pitch travel and the number of direction changes.
- A more interesting comparison would be with no IPC and the standard mooring configuration: does it have less yaw motion and more power production? If it is nearly the same, then there is a nice argument for the SPM and no yaw actuator.
- Have you optimized the gains to achieve the best possible yaw regulation? Is there an upper limit on the yaw regulation that can be achieved by IPC? This is the kind of thing I was hoping to learn from this article.
- Fig 13:
  - I'm not sure this rose plot is the proper way to show these results. Some quantitative measures are provided above. Do the blades only need to vary from 16.5 deg to 17.5 deg? If a higher gain and larger IPC contribution were used, would the yaw motion vary less?
  - L235: why is it counterintuitive?
- I'd expect there to be more interesting trade-offs near rated and with misaligned wind/waves. What happens in these cases?