Wind Energ. Sci. Discuss., referee comment RC1
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Comment on wes-2022-86

Anonymous Referee #1

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-RC1, 2022

Dear Authors,

Thank you for this interesting and novel piece of work. From a controls perspective, it is interesting to see how IPC can be leveraged to control the motions of a FOWT, without having to rely purely on hydrodynamic design. That being said, I have a rather general question regarding the control design for this IPC task. As mentioned in the article, a PID controller is used.

- Would it be possible to elaborate on the model used to design this controller? Is it a linearized version of the model or some other method is used to design the controller?

-I also have a question about the controller gains. Results are shown for several cases with different inflow velocities. Is the controller kept the same for all different wind speeds, or is some form of gain scheduling necessary?

- Finally, would it be possible to get time graphs for the blade pitch angle? It might be interesting to see the actuation signal over time, to see if this kind of control action can also be realistically applied on a real wind turbine.

I also have a question regarding some of the units on Figures 3,4 and 7. The blades are capable of giving up to 8 kNm of torque at 20 m/s, whereas the graphs for moment generated by the turbine are an order of 10^3 higher magnitude. Is this mislabeling the y -axis, otherwise how can we influence the introduced moments with blade pitch angles?

For Figure 8, when a platform is yawed at high angles (around 90 degrees) w.r.t. inflow conditions, how can it still produce any meaningful thrust to result in a moment that keeps the platform yawing? I find the 20 m/s case interesting, as it continues to yaw even though the turbine is facing away from the wind inflow direction.

I look forward to seeing your replies.