Dear authors,

After reading your publication titled "*Static Closed-Loop Wake Steering and Induction Control in Floating Wind Farms for Load-Constrained Power Optimization*", I do have some comments, which are stated below. The publication discusses three controllers that use wake steering and induction control to maximise the power output of a four-turbine floating wind farm simulated in FAST.Farm. My reservations are mainly linked to (a) the novelty of the work, (b) the terminology, and (c) the verification and validation tools. The publication is further well-written and well-presented, though too long in my eyes.

With kind regards.

Criticism 1: Novelty

Your work discusses three controllers, designed/optimised using a methodology introduced in 2022 [1], applied under steady-state conditions, with a well-established steady-state engineering model to maximise power with a seemingly hindsight focus on loads. I further disagree with the closed-loop terminology (see below), given the state of the art in related research over the past years.

As a result, the remaining stated novelty of the publication is primarily that these tools are applied to a floating wind farm rather than a fixed-bottom one.

Knowing this, I would have expected a stronger focus on what makes these established controllers behave differently on floating platforms, and on where we can leverage them or need to pay more attention to the floating context. The publication, however, lacks depth in this manner. Thus, put harshly, the publication reads more like an engineering consultancy report or a master's thesis than a scientific publication, with the focus on advancing the state of the art.

I urge the authors to review the publication and make the work's novelties stand out more, while significantly reducing the space devoted to well-established methodologies.

Criticism 2: Terminology

"Observation" and "observer" are terms used in the manuscript which, in the systems and control context, are reserved for dynamic measurement mechanisms. Classic examples are the Luenberger Observer or the Kalman filter. In contrast, a static translation could be referred to as a calibration curve or a static mapping. An important difference is that a static mapping passes measurement noise directly and is usually accurate only at equilibrium, whereas an observer filters out noise and tracks states during transients. That being said, the term “estimator” is broader than “observer” and also encompasses static least squares estimators, which is what you are using.

In your case, the wind speed is determined by an optimisation problem, u = min_u (p_farm – p_floris(u))^2, which is a complex yet static map that we could rewrite as u = f(p_farm). In fact, you do even compute this map instead of solving the problem online. One step further, the optimal setpoints are also determined by an optimisation problem independent of time.

I am writing this because it raises the broader question of whether the term “Closed-Loop” is justified in this case. If we look at previous literature in a similar context, [2,3] and, more recently, [4], the authors continuously update the parameters of the steady-state engineering model as part of their estimation. This changes the premise, in which the setpoint optimisation depends on time because the wake parameters change over time. Your work mirrors the use of a lookup table, where, instead of interpolating between precomputed setpoints, you use functions that depend on precomputed parameters.

Criticism 3: Verification / Validation tools

Is FAST.Farm suitable to model induction control? The model, at its core, still uses a steady-state wake shape, which is enhanced by synthetic turbulence. To that end, I see FAST.Farm as an, arguably more complex, FLORIS alternative, rather than a proper validation platform. As far as I know, the model does not feature turbine-induced induction, which should play a significant role in induction control. Instead, I would have expected something along the lines of an LES or at least RANS / URANS to make the step back to directly modelled fluid dynamics. A related recent example is the work [5], which you also cite, that designs a hybrid controller using both yaw and induction control and is validated in LES. You yourself even highlight observed mismatches in induction control between models and experiments. This also extends to the question of how much we can trust results like the power spectral density presented in Section 3.5. These results rely heavily on accurate turbulence modelling in the wake, which may not be the case [6].

[1] Serial-Refine Method for Fast Wake-Steering Yaw Optimization, Fleming et al. 2022

[2] Closed-loop model-based wind farm control using FLORIS under time-varying inflow conditions, Doekemeijer et al. 2020

[3] Optimal closed-loop wake steering – Part 2: Diurnal cycle atmospheric boundary layer conditions, Howland et al. 2022

[4] Quasi-Static Closed-Loop Wind-Farm Control for Combined Power and Fatigue Optimization, Sood et al. 2025

[5] Joint Yaw-Induction Control Optimization for Wind Farms, Heck et al. 2025

[6] The spatial organization of wind turbine wakes, Lengyel et al. 2025

Additional comments

- The paper is very long. This is due in part to the presentation of the results and in part to repetition. Aim to review the manuscript for parts where you can refer more to existing literature or previous sections, e.g. statements surrounding Serial Refine. The results can also be condensed. Currently, sections of the text just repeat what the figures say. Please revisit this part.
- Fig. 2 Review the capitalisation of "u" and "U" to be consistent with Section 2.5.3. It is a bit unfortunate to use the same letter for the control setpoint vector and the wind speed.
- Line 234 – You argue that the approach could be copied with SCADA data, but I wonder if that is the case. In your experiments, you collect data over long periods under constant wind conditions, which generally would not be the case in the field. Further, you'd need to convince the operator to apply likely sub-optimal yaw misalignments to collect tuning data.
- Line 253 – Weird wording with the citation
- Section 2.5.2 – What about the floater and floater displacement?
- PSD is already used on page 26, but only defined in the caption of Fig.12 on page 28.