Wind Energ. Sci. Discuss., referee comment RC2
https://doi.org/10.5194/wes-2021-71-RC2, 2021

Comment on wes-2021-71

Anonymous Referee #2

Referee comment on "Dynamic robust active wake control" by Stoyan Kanev and Edwin Bot, Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2021-71-RC2, 2021

This was an excellent paper providing useful contributions in an area of very high interest. The paper is practical and well though through, and the case studies provide very helpful exploration of the results.

General Comments:

Section 2.1: Do I understand that wind directions variations occur in the range of 30min - 24hr, and that faster frequencies are uncorrelated spatially? If we expect a wind turbine to yaw something like several times every 10 minutes does this match?

Could you provide a definition of stochastic programming in general and how it is used in this work?

Specific comments:

Page 2:

"This conclusion is implicitly confirmed by the fact that the industry starts to develop this technology into commercial products (Siemens Gamesa Renewable Energy, 2019)."

Could also be that the loads are higher but not importantly so?

Page 3:

In a different work, the same author demonstrates that a centralized yaw control strategy, in which information from surrounding wind turbines is used in the yaw control algorithm, can lead to a drastic reduction in the yaw duty and increase the power capture at the same time (Bossanyi, 2019).

This could also be related to the concept of consensus control:

Annoni, J., Bay, C., Johnson, K., Dall'Anese, E., Quon, E., Kemper, T., and Fleming, P.: Wind direction estimation using SCADA data with consensus-based optimization, Wind Energ. Sci., 4, 355–368, https://doi.org/10.5194/wes-4-355-2019, 2019.

This sentence:

This Kaimal spectrum is used for frequencies above 10−3 150 Hz, i.e. time scales of 30 minutes and slower

If the range is above a frequency, do you mean lower and not slower?

Page 6:

The parameter c(αrs) is the decay factor

Decay of what?

Page 10: Recommend to explain figure 2 in more detail in the caption

Page 13: Don't need to revise the paper, but wanted to note I think some recent papers might point to a distribution for yaw loss exponent centered somewhat higher, or even dependent on wind speed:

Simley, E., Fleming, P., Girard, N., Alloin, L., Godefroy, E., and Duc, T.: Results from a Wake Steering Experiment at a Commercial Wind Plant: Investigating the Wind Speed Dependence of Wake Steering Performance, Wind Energ. Sci. Discuss. [preprint], https://doi.org/10.5194/wes-2021-61, in review, 2021.

Page 15

Variations in the thrust curve and the yaw-induced power loss exponent have generally

limited impact on the optimal yaw set-points, which suggests that they could be left out from the robust optimization.

This is surprising, at least for the power curve exponent, it would seem that at some loss level it would start to have a strong impact,?

Page 19:

The yaw set-points for the remaining turbines in the row are linearly decreased between the second turbine and the last one, which has zero yaw misalignment set-point

This is a great idea! Is this novel to this paper or has it the concept been used elsewhere?

Page 21:

Metrics are really useful, the power gain per unit yaw travel increase is very interesting, is this also a novelty of this paper or something used in other papers or other contexts

Page 23:

Results for hysteresis are very promising. If 4 deg is both the highest value tested and the best overall, does it suggest 5 deg or more should be considered?

Page 24:

Having significantly less start/stop events in the reference case than with AWC might first seem couter-intuitive, but does happen

Did this sentence mean to say the reverse (49% reduction)?

Page 28:

Recommend to cite paper mentioned above on consensus control