WESD

Interactive
comment

Interactive comment on "Wake steering optimization under uncertainty" *by* Julian Quick et al.

Anonymous Referee #1

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This paper investigates the impact of uncertainty in inflow conditions on the optimization of wake steering strategies in wind plants by formulating a design optimization under uncertainty problem, compared to existing research which typically formulates a deterministic optimization.

The paper is well-written, and different cases are investigated, and the discussions and conclusions are supported by corresponding results.

The findings in this paper have important guidance on the plant control strategies, that is, it is important to incorporate the various uncertainties in plant control analysis.

Overall, acceptance is suggested after the following minor comments are addressed.

1. The x, y labels of figure 1 are not showing up correctly

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Discussion paper

2. Page 6, line 4, the parameters are assumed to be independent, is this a reasonable assumption? How about dependence between them, how would the dependence impact the results? Some discussions would be helpful.

3. Section 2.3.2, line 8-9, is polynomial chaos expansion used to approximate f_10 for given value of mu, sigma? What are the inputs and output for the polynomial chaos expansion? The size of the training set? A bit more details can be added. Also, some discussion on the computational effort of the numerical model could be helpful to motivate the use of polynomial chaos expansion.

4. Following the earlier comment, unless I am misunderstanding some of the discussions in first paragraph of section 2.3.2, the statement in line 10-11 in section 2.3.2 may not be accurate. Polynomial chaos expansion is some surrogate modeling technique to reduce the computational effort of directly running the expensive numerical model, while quadrature is for integration, they are two different methods for two different purposes, and they cannot be directly compared.

5. Page 8, line 6-8, what is the nested sampling routine? some explanation could be helpful, since this is related to the calculations/simulations that are done.

6. Page 9, line 1, the meaning of this sentence is not clear.

Interactive comment on Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2019-72, 2019.