Wind Energ. Sci. Discuss.,
https://doi.org/10.5194/wes-2018-66-RC2, 2018

Open Access WIND ENERGY SCIENCE DISCUSSIONS

Interactive comment on "Multipoint high-fidelity CFD-based aerodynamic shape optimization of a 10 MW wind turbine" *by* Mads H. Aa. Madsen et al.

Anonymous Referee #2

Received and published: 3 December 2018

This paper presents an adoint-based method optimisation of a wind turbine blade under a number of optimisation conditions. Convergence is shown to occur for a range of mesh resolutions, and within the constraints optimum designs are found. The article focuses on the comparison between low order (BEM) with high order (CFD) solutions. More focus on medium-order solutions would improve the general literature review of the article. Both single point and multi-point optimisation is carried out. The multipoint optimisation of the surface is carried out, which outlines the relevance and importance of the contribution, as it demonstrates a tool which completely optimises the aerodynamic shape.

General comments:

- Lines 10-20, restatement multiple times of advantages of CFD over BEM - Section

1.1: No mention is made of optimizations using medium-order fidelity tools. Is this deliberate or was little material found? - Computational resources and times would be appreciated to allow a connection to designing engineers.

Specific comments:

- Line 24: In the reviewer's experience, the role of a winglet is exactly that: to reduce induced drag on a lifting body. This hence is not necessarily surprising. - Page 16: Line 12: More specifically: Given that the analysis here is carried out on a rigid geometry, tower influence can likely be neglected. - The reviewer believes the discrepancy in the optimum twist angle is likely due to the result of making use of specified polar data for the BEM1 optimisation (without having read the reference. . .) - Please provide more details on the multipoint optimisation, particularly the profile optimisation parameters.

Technical corrections:

- English: naive (multiple locations) - Page 4: Ln 21: "an 11% increase. . ." - Page 25: Line 10 Table ?? - Page 25: Figure 12: Tab ?? - Page 35: Line 14: superfluous

Interactive comment on Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2018-66, 2018.