

Interactive comment on “Brief communication: Extraction of the wake induction and angle of attack on rotating wind turbine blades from PIV and CFD results” by Iván Herráez et al.

Anonymous Referee #2

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Review of paper WES-2017-43

Brief communication: Extraction of wake induction and angle of attack on rotating wind turbine blades from PIV and CFD results.

Authors: I. Herraez et al.

The brief communication presents a new method for determining the blade sectional angle-of-attack distribution from PIV and CFD results. Experimental and computational results are analyzed for the MEXICO rotor (new MEXICO data). Discrepancies between PIV data and CFD results are discussed with emphasis on root and tip effects. While axial-/angular induction factors show reasonable agreement, angle-of-attack dis-

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tributions agree quite well which is a nice overall result.

General comments:

The paper is written quite well (check for a few typos and replace ‘like’ by more appropriate choice of word) and is of interest to the wind energy community. The reviewer appreciates the conceptual idea of determining the angle of attack at the bisectrix between blades as it opens an opportunity for a consistent comparison between experiments and computations. The proposed method is easy to implement/apply to any wind turbine rotor. This is the major strength of the manuscript. - However, the reviewer has a few comments of concern, see below:

1. MAJOR CONCERN (has to be addressed with supporting data before manuscript can get published): Is the bisectrix line representative of the angle of attack along the blades? Both books of Manwell and Burton do have a figure on the azimuthal variation of the induced flow in the rotor plane. Now how can the angle of attack measured at the bisectrix be representative? This would work if the authors can show that indeed $V_0(1-a)/[\Omega r(1+a)]$ is the same along the blades and along the bisectrix lines. Again, the method is interesting but there is no support for its physical correctness. This has to be addressed with some analyses/results before the paper can be accepted! This would benefit the manuscript and make it highly relevant to the wind energy science community.
2. Section 2 would absolutely benefit from a clear sketch illustrating the velocity sampling of past methods and the present method. I think this could be done easily and the manuscript would benefit a lot from a clear illustration.
3. As a follow-up to comment 2, the referee would have to explore the details of Method 3 [Shen 2009] but I don't think the latter is described fully correct (page 3, “arbitrary control point”?). Again, a clear sketch would probably be of help.
4. As a follow-up to comments 1-3, the new method should be shown to be superior

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to older methods. The authors can probably retrieve CFD data to apply to at least a couple of the older methods.

5. The authors state at least four times that the new method “opens up new possibilities”. - Which ones ?

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