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Open Access WIND ENERGY SCIENCE DISCUSSIONS

Interactive comment on "The Second Curvature Correction for the Straight Segment Approximation of Periodic Vortex Wakes" *by* David H. Wood

J. Saverin (Referee)

j.saverin@tu-berlin.de

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General Comments:

This paper discusses the second curvature correction applied to the treatment of a wind turbine wake with vortex filaments. From a purely theoretical point of view, the results are quite interesting and the methods used appear valid. It is shown which terms (or vortex rings, and their segments) contribute the most to this correction.

Although as a theoretical treatment of an idealized case, the work is quite facinating, it is to the author's opinion unlikely that the result will be applied to numerical modelling

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Discussion paper

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of a wind turbine wake. The main advantage of using vortex filaments to treat the wake is that they are treated as material elements and convect under the local velocity field, so they allow the changes to the induced velocity due to the wake deformation to be treated. This method applies only to aligned segments, which hence represent a prescribed wake. In the case of the deformed wake, the self-induction corrction then appears to be more relevant.

Specific Comments:

- The expression from Equation 9 seemingly appears from nowhere. Is this an analytical result? - Regarding Equations 11-15. Is it really necessary to show these equations? They are extracted from a relatively simple equation, and were evaluated numerically anyway. Does presenting them in this (seemingly more complicated form) serve any purpose? - Page 10: Is this not a reduction by only "one" order of magnitude?

Technical Comments:

- Page 4: "Figures 1 and fig0a" - Page 5: Caption: Influence Coefficients capitalized - Page 6: "positive positive" - Page 7: Caption, Figure 4: "$\times$, Equation (17);o Equation (17)" - Why did the author refer first to Figure 5, however Figure 4 appears first in the document. Perhaps better to reorder. - Page 8: Figure 5: Caption: Ns = ...'and' (italics) 160. - Conclusion: The correction is needed because the straight segment approximation....?

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