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

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The simulation of vortex filaments movement is important for the free-vortex wake method which having been widely used for aerodynamic predictions of wind turbine and helicopter rotors. This paper investigated the second curvature error of induction velocity of curved vortex filaments and presented a model for induction velocity correction of vortex ring model. This paper shows high quality scientific contribution to the free-vortex method improvements and engineering applications.

Detailed comments 1. The induction velocities of blades are mostly contributed by the induction of near wake, which was expanded and helical lines. How does the second

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Discussion paper

curvature error affect the blade induction velocities and loads?

2. The free-vortex wake is based on potential flow assumption. Theoretically, the vortex wake was convected to downwind infinite distance. However, the concentrated tip vortex only existed a short distance and was dissipated in far wake. Author tested the correction model for far wake models based on vortex theory. What is the engineering significance of far wake modelling using free-vortex wake?

3. In the introduction, the author mentioned that "The purpose of this paper is to document the importance of the second correction for wind turbine wakes under some operating conditions". In my understanding, this operating condition is normal power production condition for wind turbine. Particularly, the modern large diameter wind turbine designed for the low wind speed operates at higher tip speed ratio (10-12) usually. It means the space of vortex rings, s, is a relative small value compared to rotor diameter. I suggest the author could add the s value for this type of wind turbine.

4. This paper will be highly interesting to engineering application if the author could explain more how to implement the second correction model for helical expanded non-periodic wake.

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