

Abstract Submitted  
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**Tip vortices in the actuator line model**<sup>1</sup> LUIS MARTINEZ, CHARLES MENEVEAU, Johns Hopkins Univ — The actuator line model (ALM) is a widely used tool to represent the wind turbine blades in computational fluid dynamics without the need to resolve the full geometry of the blades. The ALM can be optimized to represent the 'correct' aerodynamics of the blades by choosing an appropriate smearing length scale  $\epsilon$ . This appropriate length scale creates a tip vortex which induces a downwash near the tip of the blade. A theoretical framework is used to establish a solution to the induced velocity created by a tip vortex as a function of the smearing length scale  $\epsilon$ . A correction is presented which allows the use of a non-optimal smearing length scale but still provides the downwash which would be induced using the optimal length scale.

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