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An Actuator Curve Embedding Method to Model Wind Turbine Wakes PANKAJ JHA[1], SVEN SCHMITZ[2], The Pennsylvania State University — The Actuator Line Method (ALM) is widely used in the wind energy community to model the complex interactions within large wind farms in large-eddy simulation (LES) of the atmospheric boundary layer (ABL) at various stability states. The state-of-the-art in ALM modeling is rooted in the work of Sorensen and Shen (2002). The major weakness of the ALM still remains in having the actuator line discretized as a superposition of individual spherically-spread body forces. The associated overlap of adjacent spherical force fields leads to a large sensitivity of computed blade loads to the way in which the spherical spreading radius is altered along the actuator line (Jha et al. 2013). An Actuator Curve Embedding (ACE) method is developed that considers a general actuator line in 3-D space where the force distribution along the actuator curve is embedded continuously onto the background mesh and without overlap. The ACE method thus is expected to show improved body-force discretization for wind turbine blades, in particular those subject to aeroelastic deformations. Some preliminary results contrasting the ALM and ACE methods are discussed. *Support: DOE.*

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