Trailed vorticity modeling for aeroelastic wind turbine simulations in stand still - DTU Orbit (03/08/2019)

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Current fast aeroelastic wind turbine codes suitable for certification lack an induction model for standstill conditions. A trailed vorticity model previously used as addition to a blade element momentum theory based aerodynamic model in normal operation has been extended to allow computing the induced velocities in standstill. The model is validated against analytical results for an elliptical wing in constant inflow and against stand still measurements from the NREL/NASA Phase VI unsteady experiment. The extended model obtains good results in case of the elliptical wing, but underpredicts the steady loading for the Phase VI blade in attached flow. The prediction of the dynamic force coefficient loops from the Phase VI experiment is improved by the trailed vorticity modeling in both attached flow and stall in most cases. The exception is the tangential force coefficient in stall, where the codes and measurements deviate and no clear improvement is visible.

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