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**Data Assimilation for the Prediction of Wake Trajectories Within Wind Farms**[1] MAXIME LEJEUNE, Universite catholique de Louvain (UCLouvain), MARION COQUELET, UCLouvain - UMons, NICOLAS COUDOU, UCLouvain - UMons - VKI, MAUD MOENS, PHILIPPE CHATELAIN, Universite catholique de Louvain (UCLouvain) — Wind turbine wake physics is by nature unsteady and highly sensitive to the local wind characteristics. While Large Eddy Simulations (LES) allow to accurately capture the flow at the wind farm scale for a wide range of atmospheric conditions, they still come at a prohibitive computational cost when it comes to online control. Based on the Dynamic Wake Meandering model, the presented model couples a meandering model and a wake speed deficit model in order to estimate the velocity field downstream the wind turbine. Focus is laid on limiting the number of input parameters by building on recent advances in flow sensing to feed the wake model with estimated inflow conditions. The remaining parameters are fine-tuned through online data assimilation techniques, thus adapting to inflow conditions. The performances of the resulting wake model are assessed using data recovered from high fidelity LES simulations.

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