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A simple dynamic wake model for time dependent wind turbine yaw[1] CARL SHAPIRO, CHARLES MENEVEAU, DENNICE GAYME, Johns Hopkins University — This work develops a time dependent wake model for wind farms that better captures the spanwise and streamwise propagation of fluctuations generated by changes in turbine thrust and yaw angle. The model builds on classic wake models by incorporating time dependence and turbine yawing. These extensions enable us to capture the spanwise skewness in the yawed turbine wake as well as the dynamic advection of the wake downstream. This model is then compared to large eddy simulations of a wind farm with upstream rows of wind turbines dynamically yawing their rotors. An important advantage of the model is it allows us to take advantage of predictions of dynamic flow phenomena to coordinate the action of individual wind turbines for farm level control. We use the model to further explore the potential of wind farms to use wind turbine yaw to provide important services to the power grid through power tracking.

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