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Dynamic overset large eddy simulations of NREL PHASE VI wind turbine AMIR MAHDI AKBARZADEH, MOHAMMADALI HEDAYAT, IMAN BORAZJANI, Texas AM University — Large eddy simulations of the National Renewable Energy Laboratory (NREL) phase VI wind turbine are performed using a non-inertial frame of reference dynamic overset grid method. The flow over the rotating parts, including blades and hub is modeled in a non-inertial frame on rotating grids, and flow over the tower and nacelle is solved in an inertial one on fixed grids. The simulations are carried out for a pitch angle of 3 degrees, and wind speeds of 7 m/s and 15m/s. For both wind speeds, the total power, force coefficient, and local pressure on the blade are in good agreement with the experimental results. Moreover, the role of a dynamic sinusoidal pitch with amplitude of 3 degrees and different frequencies ranging from 2.4/s to 7.2/s is investigated on the performance and wake of the turbine. The results of simulations indicate that a dynamic sinusoidal pitch cannot enhance the aerodynamic performance of the turbine but it can modify the wake of the turbine. This work was partly supported by the National Science Foundation (NSF) CAREER Grant CBET 1453982, and the High Performance and Research Center (HPRC) of Texas A&M University.

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