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Effects of wave induced motion on power generation of offshore floating wind farms KOUROSH SHOELE, johns Hopkins University — Wind power has been the world's fastest growing energy source for more than a decade. There is a continuous effort to study the potentials of offshore floating wind farms in producing electricity. One of the major technical challenges in studying the performance of offshore floating wind farms is the hydrodynamic and aerodynamic interactions between individual turbines. In this study, a novel approach is presented to study the hydrodynamic interaction between group of floating wind turbines and determine how wave induced motion of the platforms modifies the power generation of the farm. In particular, exact analytical models are presented to solve the hydrodynamic diffraction and radiation problem of a group of floating wind turbine platforms, to model the aerodynamic interaction between turbines, and to quantify the nonlinear dynamic of the mooring lines used to stabilize the floating platforms through connecting them to the seabed. The overall performance of the farm with different configuration and at different wind and wave conditions are investigated and the effects of the sea state condition as well as the distance between the turbines in the farm on the low frequency temporal variation of the power output are discussed.

Kourosh Shoele
johns Hopkins University

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