



Modelling and Control of Wind Farm Dynamic Interactions

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Image from: <https://www.msp-platform.eu/sector-information/offshore-wind-energy>

Multiple wind turbines are grouped in a wind farm for operational and economic merits. However, the dynamic interactions between these wind turbines make the wind farm a highly non-linear and time-varying system. The present modelling and control practices in the industry often represent a wind farm as an equivalent Linear Time-Invariant (LTI) system in favour of simplicity and ease of computation. This simplification might result in sub-optimal performance of the wind farm, which translates to reduced power extraction and increased dynamic mechanical loads on the turbine. My research objective is to analyze the impact of the dynamic interactions between wind turbines on various state variables of the system. Furthermore, to develop robust control algorithms to ensure optimal performance of the wind farm while minimizing the response time of the control actions following a disturbance in the power system.

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