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Switching Transient in Offshore Wind Farm

In order to connect the offshore wind turbines, large undersea cable connections are required. Since each wind turbine has a step-up transformer, a row of Offshore Wind Farm (OWF) composed of cable-transformer sections which are linked in series.

Wind Turbine Transformers (WTTs) can be exposed to dielectric failures, internal insulation damage as well as external one due to overvoltages, e.g. energization overvoltages, earth fault, current chopping, and voltage escalation of VCB during disconnection.

The aims of this PhD study are:

- 1- Study and simulation of transient phenomena in a row of OWF and focus on the potential of resonance phenomena with the help of black box modelling of WTTs. In this phase, the external overvoltage on transformer terminals are investigated in different transient phenomena for various OWF configurations.
- 2- Development of the High Frequency (HF) modelling of WTTs based on gray box models such as RLC expanded latter model and the analysis of resonance overvoltages along transformer winding. A 500 KVA transformer with probes along the winding is going to be applied to validate the HF model of WTT with experiments.

