

Optimization of Operational Modal Analysis techniques for rotating systems

Context of the master thesis

Having punctual values of the modal parameters of wind turbine gearboxes available is becoming increasingly more important due to the up-scaling trend within wind industry. Characterizing the dynamics of the gearbox is particularly stringent for being able to tackle Noise, Vibration and Harshness (NVH) issues and to optimize the turbine lifetime. Continuously monitoring the modal behavior of this system using Operation Modal Analysis (OMA) is however not straightforward due to the presence of harmonic content in the vibration signal. This thesis aims to investigate several modal parameter estimation techniques within the context of rotating machinery and to investigate their distinct merits. This will first be done by validating and benchmarking the performance of different techniques available in literature on measurements of a static structure. Afterwards, the different algorithms will have to be automated in order to gain insights in the long-term modal behavior of an offshore wind turbine.

Tasks:

- Literature review on existing modal parameter techniques
- Comparison of existing methods and investigation of potential for improvement and automatization
- Validation of these methods on real life field measurements from an offshore wind turbine integrated in a big data infrastructure



Figure: Investigated Offshore Wind Turbine

Supervisors

Jan Helsen
(jan.helsen@vub.ac.be)

Other contact persons:

Patrick Guillaume
patrick.guillaume@vub.ac.be

Working language

English

Student profile

Engineering, interested in gearboxes and wind turbines, experimental signal processing techniques