VÆR MED TIL AT
LAVE SPÆNDENDE
PROJEKTER
MED ENERGINET

Evaluation of large-disturbance voltage stability in power systems with high penetration of renewable energy sources

SEMESTER:	**Semester project or master thesis.**
KEYWORDS:	Power transmission systems, voltage stability, dynamic security assessment
BACKGROUND:	The transmission system operator (TSO) must ensure that the power system is stable when exposed to large disturbances, such as solid three-phase faults. However, assessing and identifying the actual stability limits of a power system is a complex task. Large variations in production from renewable energy sources (RES), flow on HVDC-interconnectors, load levels and the availability or shortage of ancillary services influence the space of possible system responses when exposed to disturbances. In order to accommodate the need to investigate a large span of system states TSO's work to automate the process of the so called dynamic security assessment (DSA). When performing DSA the power system engineer must assess and evaluate the system stability based on RMS simulation results utilizing dynamic power system models. However, evaluating a large number of dynamic system responses is an extensive task. Furthermore, in the absence of clearly defined stability limits and criteria, the actual outcome of the assessment may depend on the subjective opinion of the individual power system engineer.
PROBLEM-STATEMENT:	The main purpose is to investigate different large-disturbance voltage stability criteria for DSA in modern power systems with large penetration of RES and HVDC-interconnectors.
DESCRIPTION:	• Identify the state-of-the-art within voltage stability assessment with focus on evaluation criteria and indices. • Perform stability analysis on a dynamic model of the Danish transmission system provided by Energinet. The model will be prepared in Power Factory (v. 17 or newer) • Analyse the voltage responses and compare and discuss different methods for identifying and quantifying the stability limits of the provided power system.
CONFIDENTIALITY:	Yes
LANGUAGE:	English or Danish
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