

Probabilistic security assessment as a tool for transmission operation

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Description

The security of a power system is its ability to withstand disturbances arising from faults and unscheduled removal of bulk power supply equipment without further loss of facilities or cascading outages. The security analysis of the transmission grid requires both deterministic and probabilistic approaches. The "N-1 security rule" is the deterministic approach classically used by Transmission System Operators for network planning and real-time operation. This rule relies on the assumption that an electrical grid will be secure if it stays electrically stable after any single failure among the N initially active network elements. Probabilistic studies can then complement (or replace?) this deterministic approach to assess the residual risk of cascading outages leading to an important amount of loss of load and to identify corresponding accidental scenarios. This MSc thesis will study how a probabilistic approach can be used in complement of or instead of a deterministic approach to optimally ensure a high security of supply in operation (e.g. through redispatch and/or topological actions).

Prerequisite

The course "Electric Power Systems I" is an important prerequisite (with a minimum mark of 14/20), but it can be followed in parallel with the MSc thesis (e.g., for students in Engineering Physics).

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