

SERVICE DE METROLOGIE NUCLEAIRE
RELIABILITY AND SAFETY OF POWER SYSTEMS

MASTER THESES

Academic year **2021-2022**

*The topics listed below correspond more to **themes** in which master theses can be realized, than to a detailed description of topics. Depending on the interest of the students, more theoretical or instead industry-related topics will be developed. Some of the proposed themes are more convenient for an **internship**, to be made before the master thesis.*

*The themes proposed are preferably **accessible mainly to students in engineering physics and in electromechanical engineering**.*

6. Risk assessment of the transmission system (in collaboration with Elia)

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The increasing share of fluctuant renewable energy sources leads to an increasing complexity and uncertainty within transmission systems that must be considered both in long term planning and operational planning, in order to ensure the desired level of security of supply. Although the security criteria of being able to cope with the unplanned outage (incident) of a grid element (N-1 security criteria) stays an important element of security of supply, probabilistic approaches are needed to complement them, such that the risks due to multiple outages can be assessed. As it is not possible to assess every single combination of outages, smart search algorithms of the combination of outages relevant to be studied are needed. These smart search algorithms must consider the possibility to have remedial actions (e.g. topological actions, actions on phase-shifting transformers) between a first and a second outage, in order to precisely limit the risk. This MSc thesis will consist in integrating remedial actions in such a smart search algorithm.