SERVICE DE METROLOGIE NUCLEAIRE
RELIABILITY AND SAFETY OF POWER SYSTEMS

MASTER THESES

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Relaxation and decomposition techniques for stochastic optimization

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Power systems must be operated in the most economical way while ensuring the desired level of reliability. A fundamental tool allowing transmission system operators to meet that objective is the so-called Optimal Power Flow (OPF). It aims at minimizing a given objective function (e.g. operating cost) while respecting operational requirements of the power system. However, standard OPF algorithms make use only of a "best estimate" for the forecast for future power system conditions. They are then not adapted to future power systems dominated by renewable energy sources, because they are not able to consider forecast errors. The consideration of forecast errors in OPF algorithms leads to stochastic optimization problems. These problems are challenging to solve numerically, due to non-linearities, non-convexities and their large dimensions. This MSc thesis will explore relaxation and decomposition techniques to solve stochastic OPF problems.