

A stochastic adaptive robust optimization approach for the generation and transmission expansion planning

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Abstract-

This paper proposes a stochastic adaptive robust optimization approach for the generation and transmission expansion planning problem. The problem is formulated under the perspective of a central planner, e.g., the transmission system operator, that aims at determining the generation and transmission expansion plans that minimize both the expansion and operation costs. This central planner builds the transmission facilities and promotes the building of the most suitable generating units among private profit-oriented investors. Uncertainties in the future peak demand and the future generation (fuel) cost are modeled using confidence bounds, while uncertainties in the demand variability and the production of stochastic units are modeled using a number of operating conditions. Results of an illustrative example and a case study based on the IEEE 118-bus test system show the effectiveness of the proposed approach.

Index Terms- Generation expansion, robust optimization, stochastic programming, transmission expansion, uncertainty.

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