

A convex chance-constrained model for reactive power planning

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Abstract

This paper presents a new approach for long-term reactive power investment planning and operation using a multiperiod mixed-integer stochastic convex model, where load uncertainty is also included. The risk of not meeting the load with a certain level of confidence due to a reactive power deficit is represented by chance constraints. Tap settings of under-load tap-changing transformers are modeled as a set of mixed-integer linear equations. Existing and new discrete and continuous reactive power sources are modeled. These type of problem is challenging and have never been studied before. The proposed model is applied to the CIGRE-32 electric power system.