

# Robust unit commitment including frequency stability constraints

Pérez-Illanes F.

Álvarez-Miranda E.

Rahmann C.

Campos-Valdés C.

An increased use of variable generation technologies such as wind power and photovoltaic generation can have important effects on system frequency performance during normal operation as well as contingencies. The main reasons are the operational principles and inherent characteristics of these power plants like operation at maximum power point and no inertial response during power system imbalances. This has led to new challenges for Transmission System Operators in terms of ensuring system security during contingencies. In this context, this paper proposes a Robust Unit Commitment including a set of additional frequency stability constraints. To do this, a simplified dynamic model of the initial system frequency response is used in combination with historical frequency nadir data during contingencies. The proposed approach is especially suitable for power systems with cost-based economic dispatch like those in most Latin American countries. The study is done considering the Northern Interconnected System of Chile, a 50-Hz medium size isolated power system. The results obtained were validated by means of dynamic simulations of different system contingencies. © 2016 by the authors; licensee MDPI.

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