

Toward a Characteristic Optimal Power Flow Model for Temporal Constraints

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Abstract : While the regular optimal power flow model focuses on a single time scan, the optimization of power systems is typically intended for a time duration with respect to a desired objective function. In this paper, a temporal optimal power flow model for a time period is proposed. To reduce the computation burden needed for calculating temporal optimal power flow, a characteristic optimal power flow model is proposed, which employs different characteristic load patterns to represent the objective function and security constraints. A numerical method based on the interior point method is also proposed for solving the characteristic optimal power flow model. Both the temporal optimal power flow model and characteristic optimal power flow model can improve the systems' desired objective function for the entire time period. Numerical studies are conducted on the IEEE 14 and 118-bus test systems to demonstrate the effectiveness of the proposed characteristic optimal power flow model.

Keywords : optimal power flow, time period, security, economy

Conference Title : ICPESE 2017 : International Conference on Power and Energy Systems Engineering

Conference Location : London, United Kingdom

Conference Dates : June 28-29, 2017