

Analysis of Steady-State Operation of Active Distribution Network under Uncertain Conditions

Zhu ruijin¹

¹Tibet Agriculture and Husbandry College

June 06, 2024

Abstract

Recently, distributed generators (DGs) have been widely integrated into distribution network, so that the distribution network is gradually transforming into an active distribution network (ADN). Due to the influence of meteorological conditions, the output of DGs has high uncertainty. At the same time, considering the increasing variety of loads in ADNs, the uncertainty of load demand of user side is also increasing. In order to fully consider the uncertainty of measurement and quantitatively evaluate the operational status, this paper proposes a steady-state analysis method for ADNs under uncertain conditions. Firstly, this paper proposes a steady-state analysis method including power flow analysis model and evaluation indicators for the operation status from the perspectives of node and network. Secondly, the uncertainty factors are elaborated from three aspects: sources, impact on evaluation index and impact on scheduling. The evaluation indicators considering uncertain conditions, the impact on system security and scheduling of network are further discussed. Finally, through the simulation analysis of the modified IEEE 33-node test system, The effectiveness of the proposed method are verified.

Hosted file

SteadyState.docx available at <https://authorea.com/users/632364/articles/1077421-analysis-of-steady-state-operation-of-active-distribution-network-under-uncertain-conditions>