A probabilistic approach for the optimal placement of PMUs with limited number of channels

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Abstract

This paper presents a two-stage method for the placement of Phasor Measurement Units (PMUs) to achieve a fully observable power system while considering the PMUs channel limitation. The first stage uses the Binary Integer Linear Programming (BILP) to find the initial optimum locations of PMUs which ensure full system observability under normal conditions. The second stage uses state enumeration based on probabilistic failure of different components to ensure full system observability under single and double outages. The proposed method is validated using the IEEE 14-Bus system, IEEE 30-Bus system and IEEE 57-Bus system. The simulation results show that the method is efficient in providing detailed information about the observability of the power system under different operating conditions.

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