Placement and Determining the Optimal Number of Phasor Measurement Units (PMU) for Power Systems Observability

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Abstract:

Nowadays, phasor measurement units are used in power networks for different purposes, such as Linearization of state estimation equations and speed improvement of controlling and protecting systems. Optimization of position and number of these equipments is considerably important because of their high costs. Effective parameters on position and number of PMUs optimization are: Network topology, zero injection buses and commonly used measurement devices in power networks. In this paper an objective function based on integer linear programming (ILP) is presented to determine the number and optimized position of PMUs, in order to complete observability of power systems. The effect of zero injection buses and prevalent measurement devices on objective function in power networks is evaluated. Simulation results are presented for the IEEE 9, 14, 30, 39, 57 and 118 buses systems. The optimization method is numerically solved using MATLAB software environment and formation of parameters of objective function in IEEE 14 buses network has been studied.

Keywords: ILP, PMU, Network, Optimization

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