Optimal Placement of Phasor Measurement Units (PMU) Using Mixed Integer Programming (MIP) for Complete Observability in Power System Network

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Abstract : Phasor measurement units (PMU) are playing an important role in the current power system for state estimation. It is necessary to have complete observability of the power system while minimizing the cost. For this purpose, the optimal location of the phasor measurement units in the power system is essential. In a bus system, zero injection buses need to be evaluated to minimize the number of PMUs. In this paper, the optimization problem is formulated using mixed integer programming to obtain the optimal location of the PMUs with increased observability. The formulation consists of with and without zero injection bus as constraints. The formulated problem is simulated using a CPLEX solver in the GAMS software package. The proposed method is tested on IEEE 30, IEEE 39, IEEE 57, and IEEE 118 bus systems. The results obtained show that the number of PMUs required is minimal with increased observability.