

## Reliability-based phasor measurement unit with outage of transmission lines

### ABSTRACT

This paper discussed on the Monte-Carlo simulation technique to determine the optimal placement of Phasor Measurement Unit (PMU) in power system whilst ensuring the observability of the system. In addition, the information on Force Outage Rate (FOR) of the system can be calculated using Markov Chain technique. The FOR represents the level of risk security for the transmission line that happened because of unscheduled and unexpected failure or repair in the system. Subsequently, the reliability model of the transmission line can be developed. Using IEEE 57-bus system, the results obtained from Monte-Carlo simulation technique demonstrate the optimal PMU placement, the desired reliability of the Wide Area Monitoring System (WAMS) as well as the number and location of covered contingencies of the system.

**Keyword:** Force outage rate (FOR); Markov chain; Monte-Carlo simulation; Phasor measurement unit (PMU)