

## **Metaheuristic searching genetic algorithm based reliability assessment of hybrid power generation system**

### **ABSTRACT**

Generating systems are known as adequately reliable when satisfying the load demand. Meanwhile, the efficiency of electrical systems is currently being more influenced by the growing adoption of the Wind/Solar energy in power systems compared to other conventional power sources. This paper proposed a new optimization approach called Metaheuristic Scanning Genetic Algorithm (MSGGA) for the evaluation of the efficiency of power generating systems. The MSGGA is based on a combination of metaheuristic scanning and Genetic Algorithm. The MSGGA technique is used for evaluating the reliability and adequacy of generation systems integrated with wind/Solar energy is developed. The usefulness of the proposed algorithm was tested using Reliability Test System 'IEEE-RTS-79' which include both of wind power and solar power generation. The result approve the effectiveness of the proposed algorithm in improving the computation time by 85% and 2% in comparison with the particle swarm optimization (PSO) and differential evolution optimization algorithm (DEOA) respectively. In addition, the proposed model can be used to test the power capacity forecasting scheme of the hybrid power generation system with the wind, solar and storage.

**Keyword:** Reliability; Genetic algorithm; Wind power generation; Solar power generation; Power supply planning