Authors:

K. Chandrasekar

N. V. Ramana

**Abstract**

This paper presents the performance comparison of meta–heuristics algorithms such as DE (Differential Evolution), PSO (Particle Swarm Optimization) and GA (Genetic Algorithm for the problem of Transmission Power Loss (TPL) minimization using Flexible AC Transmission System (FACTS) devices. In addition to that a novel power flow method is proposed using

Broyden – Shamanski method with Sherman – Morrison formula (BSS) to reduce the computational time without loss of accuracy and the results are compared with the conventional Newton Raphson (NR) method. Simulation test are carried on WSCC 9 bus, New England 39 bus and IEEE 118 bus test systems. Results indicate that location of FACTS device using DE algorithm minimizes TPL better with higher computational efficacy when compared to PSO and GA.

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# Index Terms

Computer Science · Power Systems

## Key words

Differential Evolution · Genetic Algorithm · Particle Swarm Optimization

Transmission Power Loss

FACTS device.