

# Disparity line utilization factor and galaxy-based search algorithm for advanced congestion management in power systems

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## Abstrak

In this paper a new approach has been used for finding the optimal location for placing the Interline Power Flow Controller (IPFC). The IPFC is used to reduce the system loss and power flow in the heavily loaded lines and improve stability of the system. Here a new method, the Disparity Line Utilization Factor (DLUF) is used for determining the optimal placement of the (IPFC) to control the congestion in transmission lines. The DLUF ranks the transmission lines in terms of line congestion. The IPFC is accordingly placed in between the most congested and the least congested line connected to the same bus. The Galaxy-Based Search Algorithm (GBSA) is used for the optimal sizing of the IPFC. The results obtained by the proposed algorithm have been compared with that of the Genetic Algorithm (GA) to ascertain the effectiveness of the proposed method on the power system performance. The proposed method is tested on an IEEE 30 bus test system. It has been shown that by using the GBSA, the tuning of the IPFC further reduces congestion in the system by about 15%.