Solving the Optimal Reactive Power Dispatch Problem Based on Moth-Flame Optimizer for Power System Operation and Planning

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***Abstract*—** The power system is a complex network which is expected to operate with consumption of minimal resources giving the maximum security and reliability. The optimal power flow (OPF) problem is an important tool to help the operator to achieve these goals by providing the optimal setting of all control variables. Due to its significant influence on security and economic operation of power systems, one of the OPF problems namely optimal reactive power dispatch (ORPD), has received an ever-increasing interest from electric utilities. This paper proposes a recent nature inspired algorithm called moth-flame optimizer (MFO) to solve the ORPD problem. MFO is utilized to find the best combination of control variables such as the real power generation to be generated, generator voltages, tap changing transformers' ratios and the size of reactive power compensation devices so that the total minimum loss in the network can be obtained. The effectiveness of MFO is tested on IEEE-30 bus system with 25 control variables and the comparison with other recent algorithms such as grey wolf optimizer (GWO), ant-lion optimizer (ALO) and multi-verse optimizer (MVO) also will be presented in this paper.

Keywords—moth-flame optimizer, optimal reactive power dispatch, optimization