

## SEEKER OPTIMIZATION ALGORITHM FOR OPTIMAL TRANSMISSION EXPANSION PLANNING WITH GENERATOR/LOAD MODELS AND FREQUENCY CONTROL

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### ABSTRACT

*Transmission expansion planning (TEP) is one of the most important parts of expansion planning in power systems. Competition in these systems has resulted in essential changes in TEP models and criteria. While methods introduced so far are essentially based on dc load flow, however ac optimal power flow (AC-OPF) in order to model the real world condition and obtaining optimal plans. TEP problems in different test power systems using a seeker optimization algorithm (SOA) have been resolved. In the SOA, the act of human searching capability and understanding are exploited for the purpose of optimization. In this algorithm, the search direction is based on empirical gradient by evaluating the response to the position changes and the step length is based on uncertainty reasoning by using a simple fuzzy rule. The objective of the TEP problem is to optimize the transmission network topology by selecting the new circuits that should be added to an existing transmission network so as to minimize the objective function. It is subjected to operating conditions for generating units and transmission network. Therefore in this chapter, SOA is proposed to solve the TEP problem based on AC-OPF in practical scenario of the power system having load/generator models and frequency controls are considered. The feasibility and effectiveness of the proposed approach is investigated and exemplarily demonstrated on the two test systems. Simulation results demonstrate that the proposed approach provides superior results compared to the results reported in the literature.*

**KEYWORDS:** AC-OPF, Seeker Optimization Algorithm, Frequency Control, Generator Model, Load Models, Transmission Expansion Planning

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