

Wanlapha Tangkananuruk 2008: Multi-Zone Transmission Expansion Planning using Genetic Algorithm. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Parnjit Damrongkulkamjorn, Dr.Ing. 54 pages.

This thesis presents transmission expansion planning of a practical multi-zone system by using the famous genetic algorithm (GA). The system, which consists of 19 buses, 7 zones and 3 voltage levels, is part of a transmission network of Electricity Generating Authority of Thailand (EGAT). The zones are defined based on the geography of Thailand. The objective of transmission expansion for this system is to find the routes, conductor types and voltage levels of the new set of transmission lines that yield the least cost while satisfying forecast load demand. The load forecast for each zone is given for 5 years. The percent increases of load are taken from the System Planning Division, EGAT. The cost considering as an objective function for GA includes installation cost of transmission lines and the cost of losses in additional transmission lines. The loss cost is the present worth computed from the annual loss cost of transmission lines assuming that the lines are in service for 20 years, while the line losses are obtained from optimal power flow of the system with forecast load as the annual average load.

The analysis results of transmission expansion planning show that the best location for additional transmission lines is the route between zone 2 and zone 7, at 115 kV, with the 3 conductors of MCM 1x795 ACSR/GA connected between buses 15 and 16

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Thesis Advisor's signature

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