

Chalongchai Yangthara 2014: Optimal Capacitor Placement for Reliability Enhancement of Distribution Systems Using Cuckoo Search Algorithm. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Dulpichet Rerkpreedapong, Ph.D. 111 pages.

This thesis presents a method for optimal placement of shunt capacitors in power distribution systems in order to minimize the Total Cost of Distribution System (TCDS), which consists of the expected interruption cost (ECOST), the investment cost of capacitors and cost of distribution losses. This objective function is optimized by Cuckoo Search Algorithm (CSA). First, CSA will randomly search for locations and sizes of capacitors to be installed in distribution systems. Then the objective function is evaluated before the theory of Lévy Flights is used to find new locations to achieve a better result. The proposed method is tested with the 9-bus and 23-bus test systems, and comparative studies are conducted through a number of case studies. The results have shown that reliability enhancement is achieved with the minimized TCDS by using the proposed method.

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