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Thesis Title : Determination of Cable Route of 380 Volts Radial System with Dynamic Programming

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Abstract

Determination of cable route in schematic diagram is essential in the design of distribution system and will affect considerably the cost of the total system. For the system with N load points the total number of possible routes are N!. Each mathod gives the cost of the system ranging from highest to lowest. In order to determine the lowest cost, every methods has to be calculated and compared which is laborious and very time consuming.

This thesis reports the study of the application of the theory of dynamic programming for the determination of cable route of a 380 volts radial system with lowest cost. The practical aspects of design such as voltage drop , actual size and cost of cable , etc. are also taking into consideration.

The method of calculation developed are tested with the 4 , 5 and 6 load-points radial system with the total of 540 combination of loads and positions. The criteria for determining the route are made in many different ways i.e. current , distance and the functions depending on both current and distance with different weighting factor indeces.

the result of the test shows that with dynamic programming theory the criterion for determining the route should be the function of both current and distance with the weighting factor indeces between 0 to 0.5 . The results with smallest errors can be obtained with 4 load points system which gives only 1.67% error. The error increases when the number of load points increses to 5 and 6 load points which are 10.56% and 16.67% ,respectively.

The analysis of the total results show that the changing of the total cost of the system which occurs each time a load point is chosen, which dose not normally occur in general dynamic programming problem (which the cost of each route is predetermined and fixed, results in the increase in errors when the total number of load point is increased. However , the application of dynamic programming in the design of radial system always gives the results which is close to the lowest cost and the step of calculation can be cut down to 50% in comparision with the calculation of all possible routes. The reduction of steps of calculation is even greater when the number of load points is increased. The sample of calculation using dynamic programming is given in the appendix.

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