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Load Flow Analysis of radial distribution network using ANN in power system- Literature Review.

KEYWORDS: Load–flow, Feeder, Lateral, Power, Voltage, Composite, Exponential

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ABSTRACT *This paper reports a technological literature review on various methods for load–flow solution of radial distribution networks with minimum data preparation. The node and branch numbering need not to be sequential like other available methods. The proposed method does not need sending–node, receiving–node and branch numbers if these are sequential. The proposed method uses the simple equation to compute the voltage magnitude and has the capability to handle composite load modelling. The proposed method uses the set of nodes of feeder, lateral(s) and sub lateral(s). The effectiveness of the proposed method is compared with other methods using two examples. The detailed load–flow results for different kind of load–modellings are also presented.*

INTRODUCTION:

Development and getting complication of electrical power systems cause the necessity of detailed studies on planning and operating sections. Studies on this area expose a concept called power flow. Power flow can be described as calculations on defining characteristic properties of steady state operating situation of energy transmission systems. Power flow analysis on a transmission system includes the calculations of power flow and voltages for specified node or busbar situations. The power flow algorithm used on balanced and three phase energy systems under steady state conditions, based on the following rules:

- Generators supply all loads and total power loss of power lines. They cannot exceed their nominal active and reactive power capacities.
- Voltage amplitudes of all busbars are about nominal voltage limits.
- Power lines and transformers cannot overload.

LITERATURE REVIEW:

[1] Smarajit Ghosh , Karma Sonam Sherpa have presented an efficient method for load–flow solution of radial distribution network has been proposed in this paper. The proposed method reduces the data preparation. The proposed method simply needs starting nodes of feeder, lateral(s) and sub lateral(s) and no data of branch numbers for sequential numbering scheme. If the node and branch numbers are not sequential, only node numbers and branch numbers of eachfeeder, lateral(s) and sub lateral(s) are required. Therefore, the proposed method consumes less computer memory. The proposed method uses the simple voltage equation.

[2] K. Vinoth Kumar, M.P. Selvan have presented a novel approach for load flow analysis of a radial distribution network, which is simple to implement and efficient in computation has been proposed and described in detail in this paper. The computational efficiency and speed of the proposed method has been tested using 28, 33, 69 and modified IEEE 34-node radial distribution networks. The comparison between the proposed and existing method ensures the speed and accuracy of the proposed approach in terms of CPU time both for varying load conditions and systems of different sizes and configurations. It can be concluded that the simplification made in the branch current computation of the proposed approach has resulted in improved computational speed of load flow analysis of radial distribution network.

[3] Serhat Berat EFE, Mehmet CEBECİ have presented main problem of power flow analysis is the necessity of processing too much parameter at same time because of the wide working area. This necessity forced engineers to develop modern methods such as artificial neural networks. In this paper, power flow analysis of five-busbar system is investigated. First, the analysis is performed by classic analytical method. Then a developed ANN is used to analysis the same system with same parameters. As the results given in table 3 are investigated, it can be seen that proposed method satisfies the convergence limits. The compared results show that the ANN works properly and can be used in power flow analysis problems.

[4] Sushil Kumar, Seraj Ahmad, Aziz Ahmad have analyze the load flow study while the system is very complex i.e. 57 bus ,117 bus and furthermore ,the conventional method of load flow study like Guass seidal , Newton Raphson are more complex and having a lots of computational works but if we use the PSO techniques we save a lots of time in computational techniques as well as there is less chance of errors and the analysis having more accuracy .

[5] M.SURESH, T.S.SIRISH In this paper an efficient and intelligent method for load flow solution to radial distribution networks has been proposed. By comparing the results of the load flow solutions by RBFN network and feed forward network with back propagation algorithm gives accurate results in acceptable range. In testing the neural network RBFN zero mean square error for trained data. But feed forward network gives some small error although RBFN gives zero error feed forward network with back propagation algorithm gives less error than RBFN other than trained testing patterns. Finally network with back propagation gives more accuracy than RBFN and also less computational time when compared with other existing load flow solutions to the radial distribution systems.

[6] J. BILBAO, E. BRAVO, Artificial neural networks are a valid option to calculate load flows of electric distribution lines whenever the three following premises come true: the line does not have to be very small (generally, real power distribution

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lines are not small), load flow is calculated with the aim to obtain approximate results and not accurate results, and there must be enough training cases for the ANN.

[7] Hassan A. Kubba Samir Sami Mahmood In this paper, a proposed method based on real-coded genetic algorithm is presented and applied to solve multiple load flow solution problem. Genetic algorithm is a kind of stochastic search algorithm based on the mechanics of natural selection and natural genetics. They combine the concepts of survival of the fittest with genetic operators such as selection, crossover and mutation abstracted from nature to form a surprisingly robust mechanism that has been successfully applied to solve a variety of search and optimization problems. Elitist method is also used in this research, and blending models are implemented for crossover operator. In the proposed work, five busbars typical test system and 362-bus Iraqi National Grid is used to demonstrate the efficiency and performance of the proposed method.

[8] Camila P. Salomon This paper proposes the application of a Particle Swarm Optimization (PSO) algorithm to the Load Flow calculation in Power Systems. The proposed methodology is based on the minimization of power mismatches in the system buses. The power flow study provides the system status in the steady-state and it is fundamental to the power system operation, planning and control. PSO is applied in a new computational model for the system power flow obtainment. This model searches for a better convergence, as well as a wider application in comparison with traditional methods as the Newton-Raphson method. This methodology was tested with numerical experiments accomplished in an IEEE 6-Bus System.

CONCLUSION:

This paper has presented literature survey on various methods of Load flow analysis using ANN in power system. Load flow study is one of the important part of power system network because all the power flow parameters we can find out by this study. There are many methods to solve the load flow problems but accuracy and speed are the main problems in all techniques. By using the PSO we can find the better accuracy and speed then another method. By using PSO techniques we find the optimal location in the system at which we can set the reactive power compensating device.

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