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A new intelligent autoreclosing scheme using artificial neural network and Taguchi's methodology

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Abstract-

This paper presents a novel intelligent autoreclosure technique to discriminate temporary faults from permanent faults and accurately determine fault extinction time. A variety of fault simulations are carried out on a specified transmission line on the standard IEEE 9-bus electric power system using MATLAB/SimPowerSytems. FFT and Prony analysis methods are employed to extract data features from each simulated fault. The fault identification prior to reclosing is accomplished by an artificial neural network trained by standard Error Back-Propagation, Levenberg Marquardt, and Resilient Back-Propagation algorithms which are developed using MATLAB. Some important parameters which strongly affect the entire training process are fine tuned with Taguchi’s method to their corresponding best values. The robustness of the developed ANN identifier is verified by testing it with the data patterns which consists of high impedance faults obtained from IEEE 14-bus benchmark system. Test results show the efficacy of the proposed AR scheme.

Index Terms- Adaptive automatic reclosure, artificial neural networks (ANNs), Error Back Propagation (EBP), Levenberg Marquardt (LM), Resilient Back-Propagation, Taguchi's method.

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