**Development of a Fault Location and Identification System for Underground Transmission Cables Based on Wavelet-ANFIS Method (2017).**

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**Abstract**

Transmission lines are the backbone of electrical power systems and other power utilities as they are used for transmission and distribution of power. Power is distributed to the end user through either overhead cables or underground cables. In the case of underground cables, their propensity to fail in service increases as they age with time. The increase in failure rates and system breakdowns on older underground power cables are now adversely impacting system reliability and many losses involved; therefore, it is readily apparent that necessary action has to be taken to manage the consequences of this trend. At any given length of a cable, its deterioration or indication of failure manifests itself through discrete defects. Identification of the type of defects and their locations along the length of the cables is vital in order to minimize the operating costs by reducing lengthy and expensive patrols to locate the faults, and to speed up repairs and restoration of power in the lines. In this paper, a method that combines wavelets and neuro-fuzzy technique for fault location and identification is proposed. A 100km, 220KV, 50Hz power transmission line model was developed and different faults and locations simulated in MATLAB/SIMULINK, and then certain selected features of the wavelet transformed signals were used as inputs for training and development of the Adaptive Network Fuzzy Inference System (ANFIS). The results obtained from ANFIS output were compared with the raw values. Comparison of the ANFIS output values and the actual values shows that the percentage error was established to be less than 2.5%. Thus, it can be concluded that the wavelet-ANFIS technique is accurate enough to be used in identifying and locating underground power line faults.

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