IDENTIFICATION AND CLASSIFICATION OF HIGH IMPEDANCE FAULTS ON 33 KV POWER DISTRIBUTION LINE USING ANFIS MODEL

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ABSTRACT

High impedance fault occurs when an energized conductor makes contact with a quasi-insulating object such as concrete, asphalt, structure, or falls to the ground. The consequence of these previously undetectable faults is that they represent a serious public safety hazard as well as a risk of arcing ignition of fires. A high impedance fault is characterized by having impedance sufficiently high that it is not detected by conventional or traditional over-current protection devices, such as fuses and over-current relays. This paper presents the development of an intelligent model for the identification and classification of HIFs on a 33 kV distribution line using ANFIS. The study was conducted on the 33 kV Uyo-Ikot Ekpene power distribution line. The case study power distribution system was modeled using MATLAB software. HIFs were introduced at various locations along the distribution line. The data obtained from the MATLAB/Simulink simulated fault using discrete wavelet transform (DWT) were used to train the ANFIS model for detection and classification of the HIFs occurrence in the system. The results of the HIF detection and classification show that the success and discrimination rate of FIS are 72 % and 89 % respectively whereas that of ANFIS 100 % and 98.9 % respectively.

Keywords: High impedance fault, identification, classification, power distribution line, ANFIS model.