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Authors:
Vanamadevi N

S. Santhi

P. Abdul Ameen

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Abstract

Impulse test is a routine test for transformers and is performed to assess their winding insulation strength. If any fault occur during impulse test, the winding current contain typical signature depending on the nature and type of the faults. Among the various impulse faults the series fault or shunt fault that may occur in the winding needs special attention since it results in heavy damage. This work is dedicated to detection and classification of such faults based on a simulation study conducted on the lumped parameter model of a specially designed 6. 6kV voltage transformer winding. The neutral currents have been recorded with series fault/shunt

fault introduced in the ten sections of the winding model simulated using circuit simulation package. These current records are discrete wavelet transformed using the db5 analysis filter bank. The statistical features extracted from the third level approximation are considered for discriminating the defined faults and are classified by training a Learning Vector Quantization (LVQ) network. The clustering of the extracted discrimination features is done using possibilistic fuzzy c means (PFCM) algorithm to obtain voronoi/initial weight vectors required for training the LVQ network. The impulse fault classification achieved with this scheme is satisfactory with 95% accuracy. This scheme is developed using MATLAB. The hardware realization of this scheme is carried out using Xilinx System generator for DSP in Xilinx SPARTAN6 FPGA.

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Index Terms

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Keywords

Transformer Impulse Faults Dwt Pfcm Lvq Neural Network Fpga.