DIFFERENTIAL PROTECTION FOR POWER TRANSFORMER USING SLANTLET TRANSFORM AND RADIAL BASIS FUNCTION

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ABSTRACT

This paper proposed a new classification method based on Slantlet Transform (ST) combined with an automated classification mechanism based on Artificial Neural Network (ANN) for distinguishing magnetizing inrush current from internal fault currents in three phase power transformers. Slantlet Transform has been regarded as a contemporary development in the field of multi-resolution analysis, which is proposed as an improvement over the discrete wavelet transform (DWT). For the evaluation of the developed algorithm, transformer modeling and simulation of internal fault currents and magnetizing inrush currents are carried out in power system computer–aided designing PSCAD/EMTDC. For each candidate internal fault or magnetizing inrush currents waveMform suitable features are extracted by employing ST. Then, a successfully trained Artificial Neural Network based classifier, developed utilizing inputs comprising the features extracted from a training set of waveforms, is implemented for a testing set of sample waveforms. The simulation results obtained show that the new algorithm is more reliable and accurate. It provides a high operating sensitivity for internal faults and remains stable for inrush currents of the power transformers.

KEYWORDS: Power Transformer, Differential Protection, Slantlet Transform, Artificial Neural Network