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Power Transformer Inrush Current Detection using Wavelet Packet Transform

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Abstract—A power transformer is the heart of the electrical distribution system. To safeguard power transformers, differential protection methods are typically employed, but there is still a chance that a differential relay could fail due to the extraordinarily high, non-sinusoidal behavior of inrush currents. Even when there is no issue, these inrush currents are sufficient to trip a differential relay. To solve this problem, numerous approaches have been developed, including those based on transformer equivalent circuits, Artificial Neural Networks (ANN), fuzzy logic, pattern recognition, harmonic restraint, voltage and flux constraint, and others. This work uses the wavelet transform-based feature extraction method to identify power transformer internal faults from inrush currents. PSCAD-simulated internal fault current and inrush current from power transformer model faults investigate the suggested method. All simulation results confirm the capability of the suggested approach to differentiate between internal faults and inrush currents.

Keywords—Power Transformer, Artificial Neural Network, Wavelet, Inrush Currents, Internal Fault