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A Sensitive ANN Based Differential Relay for Transformer Protection with Security against CT Saturation and Tap Changer Operation

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Abstract: This paper presents an artificial neural network (ANN) based scheme for fault identification in power transformer protection. The proposed scheme is featured by the application of ANN to identifying system patterns, the unique choice of harmonics of positive sequence differential currents as ANN inputs, the effective handling of current transformer (CT) saturation with an ANN based approach, and the consideration of tap changer position for correcting secondary CT current. Performance of the proposed scheme is studied for a wide variety of operating conditions using data generated from simulation. The results indicate that the proposed scheme provides a fast and sensitive approach for identifying internal faults and is secure against CT saturation and transformer tap changer operation.

Key Words: Differential protection, power transformer, current transformer saturation, artificial neural network