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Power transformer diagnosis based on wavelet transform and KNN classifier

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This paper introduces an effective pattern recognition scheme for classifying the power transformer faults, based on a combination of wavelet transforms (WT) and K-nearest neighbor classifier (K-NN). Stationary wavelet transform determinate function feature vectors, while K-NN is one of the excellent tools used to classify these feature vectors. The proposed scheme for power transformer is based on the differential protection principles and overcomes the shortcomings of the previous algorithms. The differential current is decomposed using multilevel discrete wavelet transform (DWT) to extract a feature vector containing two distinct statistical features which discriminate between inrush and fault currents. More than 100 inrush and fault events were simulated on a 155 MVA power transformer using ATP-EMTP and a feature vector was extracted from each case; these vectors were used to train a KNN classifier to obtain a decision boundary. The simulation results show the advantages of the algorithm from the accuracy of the decision, fast response, and the low computational overhead.

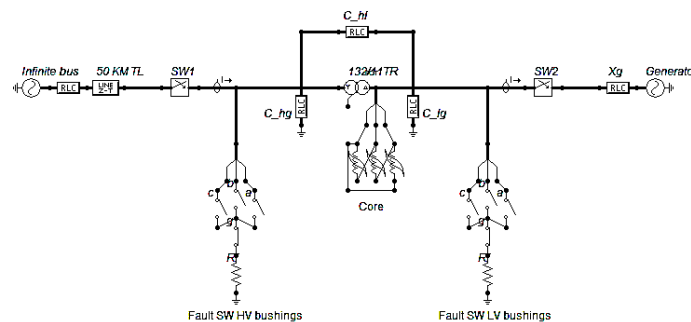


Figure 1: ATP circuit of the power system used for simulation.

Recent Publications

1. S Hasan, El-Sayed El-Rafaie, A Al-Aboudy and A Hamada (2017) An AC hybrid current limiting and interrupting device for low voltage systems. Alexandria Engineering Journal.
1. M Eissa, S Hasan and S Saleh (2017) A new digital filter direction relay technique using active/reactive power portrait. Electric Power and Energy Systems 86:33–52.

Biography

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