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Acoustic Partial Discharge Propagation and Perfectly Matched Layer in Acoustic Detection-Transformer

Authors : Nirav J. Patel, Kalpesh K. Dudani

Abstract : Partial discharge (PD) is the dissipation of energy caused by localized breakdown of insulation. Power transformers are one of the most important components in the electrical energy network. Insulation degradation of transformer is frequently linked to PD. This is why PD detection is used in power system to monitor the health of high voltage transformer. If such problem are not detected and repaired, the strength and frequency of PD may increase and eventually lead to the catastrophic failure of the transformer. This can further cause external equipment damage, fires and loss of revenue due to an unscheduled outage. Hence, reliable online PD detection is a critical need for power companies to improve personnel safety and decrease the probability of loss of service. The PD phenomenon is manifested in a variety of physically observable signals including Ultra High Frequency (UHF) radiation and Acoustic Disturbances, Electrical pulses. Acoustic method is based on sensing the radiated acoustic emission from discharge sites in the insulation. Propagated wave from the PD fault site are captured sensor are consequently pre-amplified, filtered, recorded and analyze.

Keywords : acoustic, partial discharge, perfectly matched layer, sensor
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