Application of Neural Networks for Detection of Acoustic Emission Signal Accompanying the Electrical Treeing Process in Epoxy Resins

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Abstract

In a high voltage insulation system important operating issue is to know a condition of insulating medium. Deterioration of that medium can be a cause of system malfunction and let to unscheduled shutdowns. In case of a solid insulation, occurring material degradation is irreversible and lets to total loss of insulating ability. Hence, significant is good knowledge of processes occurring in isolations and ability to forecasting life time of such an insulations. There are known many methods of solid dielectrics state diagnosis used in insulation systems designing. Among these methods particular attention should be paid to non-invasive methods. One of these is acoustic emission method (AE), which is based on analyzing of elastic acoustic waves generated while destruction of atomic bonds in dielectric atomic structure. The paper presents analysis of AE signal, and more specifically the use of neural network for detection in recorded AE signal the presence of electrical treeing process. Presented were structure of neural network, algorithm of learning and signal analysis. Next, described in article neural network application was verified with simulated signal with random noise. Finally, verified application was used with random recorded signal.

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