

油纸绝缘老化的超宽频带局部放电信号时频域特性逐步判别分析

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摘要

传统局部放电检测方法测量和分析1MHz以下信号, 测量频带窄、信息量少、易受干扰, 不能全面反映局部放电本质特征。首先对多个试品进行电热联合老化试验, 然后用超宽频带局部放电测试系统, 将时域参数和频域参数相结合诊断油纸绝缘老化状态。通过逐步判别分析, 先选取13个时频域特征参量中的8个重要特征参量, 建立典型判别方程, 描出对应的散点图。继而又推导出分别表征油纸绝缘5个老化阶段的Bayes线性判别方程。经原样本组内验证和Jackknife法交叉验证, 所建方程组用于诊断油纸绝缘老化状态具有良好的效果。

关键词 [逐步判别法](#); [局部放电](#); [油纸绝缘](#); [超宽频带](#); [变压器](#)

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Stepwise Discriminant Analysis on Time-Domain and Frequency-Domain Characteristics of Ultra-Wideband Partial Discharge Signals for Oil-Paper Insulation Ageing

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Abstract

Due to its defects such as narrow frequency bandwidth of measurement, less information, easy to be interfered and unable to reflect essential characteristic of partial discharge in the round, traditional partial discharge detection is used to measure and analyze partial discharge signals whose frequencies are below 1MHz. To remedy these defects, under-mentioned method is used: firstly, the electro-thermal ageing test is performed on specimens; then combined time-domain parameters with frequency-domain parameters and by means of ultra-wideband partial discharge system, the ageing state of oil-paper insulation is diagnosed; by use of stepwise discriminant analysis, eight important characteristic parameters are chosen from thirteen time-domain and frequency-domain parameters, and then the typical discriminant equations are built and corresponding scatter diagram is plotted; afterwards, the Bayes linear discriminant equations that characterize five ageing stages of oil-paper insulation are deduced. The validation result of original specimen group and the results of Jackknife cross-validation methods show that the established equation sets are effective for the ageing diagnosis of oil-paper insulation.

Key words [stepwise discriminant analysis](#); [partial discharge](#); [oil-paper insulation](#); [ultra-wideband](#); [transformer](#)

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