

电机电工

## 绝缘子安全区泄漏电流频谱特征提取及污秽状态预测

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摘要

针对现有染污绝缘子在线检测系统基于泄漏电流时域特征预测绝缘子污秽状态,而忽略了泄漏电流频域成分中含有丰富信息量的问题,提出了利用快速傅里叶变换(FFT)与功率谱估计相结合的分析方法,提取出泄漏电流的2个频谱特征量:3次谐波与基波幅值比k和功率谱中高频能量与总能量之比a,作为污秽状态预测参量。该文主要研究运行电压下安全区(<20mA)内,分别改变湿度和污秽度情况下,泄漏电流的频谱特征,泄漏电流受湿度以及污秽变化的频谱特征,目的是将绝缘子污秽状态预测提前到安全区来。现有的试验结果表明,利用频谱特征量k和a的变化规律,能有效预测绝缘子表面的湿度和污秽度状况。

关键词 [污秽绝缘子](#) [泄漏电流](#) [频谱特征](#) [功率谱估计](#) [安全区](#) [湿度](#) [污秽状态](#)

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## Abstracting Frequency Spectrum Characteristics of Insulators Leakage Current in Safety Zone to Forecast the Contamination Condition

Abstract

Time domain characteristics of leakage current of insulators have been used to forecast contamination condition, but abundant forecast information in frequency components of leakage current has still been ignored. To solve this problem, new analysis method using FFT conversion and power spectrum estimation is used. Two characteristic values in frequency domain are abstracted as forecasting parameters of insulators' contamination condition: the ratio of amplitude value between third order harmonic and fundamental component (k) and the ratio of high frequency energy and total energy(a). This paper studied frequency spectrum characteristics of leakage currents in safety zone (<20mA) under operating voltage when environment humidity and contamination condition are changed. The main aim is to bring forecast of contamination condition of insulators forward to safety zone. Testing results show that frequency spectrum characteristics (k and a) can be used to forecast condition of environment humidity and contamination condition of insulators effectively.

Key words [contaminate insulators](#) [leakage currents](#) [frequency spectrum characteristic](#) [power spectrum estimation](#) [safety zone](#) [humidity](#) [contamination condition](#)

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