

高电压技术

采用分形和支持向量机的气体绝缘组合电器局部放电类型识别

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摘要:

局部放电可以反映气体绝缘组合电器(gas insulated switchgear, GIS)内部的绝缘缺陷, 正确识别GIS的放电类型具有重要意义。放电信号特征量的提取和模式识别器的设计对最终判别结果影响较大, 因此有必要将分形理论和支持向量机应用到局部放电类型识别中以提高识别效果。在简单介绍了分形理论和支持向量机后, 采集了4种绝缘缺陷的放电数据, 应用分形理论从j-q-n灰度图中提取放电特征, 并构造6个二分类支持向量机识别器, 采取投票法识别放电类型。实验结果表明, 该方法与反向传播网络方法相比具有识别率高、稳定性好的优点, 能有效识别GIS放电类型。

关键词:

Identification of Partial Discharge in Gas Insulated Switchgears With Fractal Theory and Support Vector Machine

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Abstract:

The internal insulation defects in gas-insulated switchgear (GIS) can be reflected by partial discharge, so it is significant to recognize the type of partial discharge (PD) in GIS correctly. The extraction of discharge signal features and the design of the identifier greatly influence the final judgment result, thus it is necessary to apply fractal theory and support vector machine (SVM) in PD type identification to improve identification effect. The discharge data caused by four insulation defects is collected and by use of fractal theory the discharge characteristics are extracted from j-q-n grayscale, and six binary SVM identifiers are constructed, then the PD type is identified by voting method. Experimental results show that using the proposed method the PD type within GIS can be correctly recognized and the proposed method is stable and possesses higher recognition rate than back propagation network method.

Keywords:

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