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变压器绕组频响指纹的特征差异指数分析法

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摘要：

频率响应分析法是诊断电力变压器绕组变形的重要方法，通过对频率响应指纹特征差异的分析可以较准确地判断绕组变形。根据经验分析的要点，提出了一种频率响应指纹特征差异量化分析方法。首先用幅值差异系数表征频率响应指纹特征点的幅值变化、用频率差异系数表征频率响应指纹特征点的频率变化，然后根据幅值差异系数和频率差异系数计算频率响应指纹间的特征差异指数，最后依据特征差异指数的大小判断绕组是否变形。经500多组数据验证，该方法优于已有的量化分析法，具有较高的判断准确率。

关键词：

Feature Difference Index Analysis on Frequency Response Fingerprint of Transformer Windings

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Abstract:

Frequency response analysis is an important method to detect transformer winding deformation. Experienced professionals can judge the winding deformation accurately by analyzing feature differences of transformer wingding frequency response fingerprint. Based on main points of experience, a new method to quantitatively analyze feature differences of frequency response fingerprint is proposed. Firstly, the amplitude difference is represented by amplitude difference index and the frequency difference is represented by frequency difference index; secondly, the feature difference indices are calculated by amplitude difference index and frequency difference index respectively; finally, transformer winding deformation can be judged through the feature difference indices. Verification results of more than 500 sets of diagnostic data show that the proposed method is evidently better than existing quantitative analysis method, and high judging accuracy can be attained.

Keywords:

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参考文献：

[1] 许渊．变压器绕组频率响应特征及诊断技术的研究[D]．北京：中国电力科学研究院，2009． [2] 程养春，李成榕，王伟．发电机局部放电脉冲沿定子绕组传播规律的研究[J]．电网技术，2005，29(8)：65-70． Cheng Yangchun，Li Chengrong，Wang Wei．Research on propagation rule of partial discharge pulses inside generator along stator windings [J]．Power System Technology，2005，29(8)：65-70(in Chinese)． [3] 卢明．发电机定子绕组击穿后的处理分析[J]．电网技术，2000，24(10)：63-65． Lu Ming．Repair and analysis of breaking down of stator winding of generator[J]．Power System Technology，2000，24(10)：63-65(in Chinese)． [4] 王洪方，王乃庆．大型电力变压器绕组轴向稳定性问题的研究状况[J]．电网技术，1999，23(4)：8-10． Wang Hongfang，Wang Naiqing．Achievement on axial stability problem of electric power transformer windings[J]．Power System Technology，1999，23(4)：8-10(in Chinese)． [5] 王洪方，王乃庆．变压器绕组轴向预紧力对绕组轴向振动特性的影响[J]．电网技术，1999，23(9)：8-11．

Wang Hongfang，Wang Naiqing．Influence of axial precompression level on axial vibrations in transformer windings[J]．Power System Technology，1999，23(9)：8-11(in Chinese)． [6] 国家电力公司发输电运营部．《防止电力生产重大事故的二十五项重点要求》辅导教材[M]．北京：中国电力出版社，2001：204-205． [7] 周渠，蔡振华．变压器绕组扭动变形的故障诊断[J]．电网技术，2004，28(12)：70-72． Zhou Qu，Cai Zhenhua．Fault diagnosis of transformer winding twist deformation[J]．Power System Technology，2004，28(12)：70-72(in Chinese)． [8] 岳章华，杨卫东，江健武．频率响应分析法检出变压器绕组变形实例分析[J]．高电压技术，2001，27(4)：74-75． Yue Zhanghua，Yang Weidong，Jiang Jianwu．Diagnosis example of transformer winding deformation using frequency response analysis [J]．High Voltage Engineering，2001，27(4)：74-75(in Chinese)． [9] 杨利水，杨旭，徐岩．电力变压器内部故障的非线性仿真模型[J]．电网技术，2009，33(20)：183-188． Yang Lishui，Yang Xu，Xu Yan．A nonlinear model to calculate post-internal fault parameters of power transformer[J]．Power System Technology，2009，33(20)：183-188(in Chinese)． [10] 何平，文习山．变压器绕组变形的频率响应分析法综述[J]．高电压技术，2006，32(5)：37-41． He Ping，Wen Xishan．Survey of frequency response analysis on winding deformation of transformers[J]．High Voltage Engineering，2006，32(5)：37-41(in Chinese)． [11] Q/GDW 168—2008 输变电设备状态检修试验规程[S]． [12] 冯复生．关于发电机定子绕组绝缘电阻测量及最低允许值的分析[J]．电网技术，2000，24(2)：5-9． Feng Fusheng．Insulation resistance measurement of generator stator winding and analysis of its minimum allowable value[J]．Power System Technology，2000，24(2)：5-9(in Chinese)． [13] DL/T 911—2004 电力变压器绕组变形的频率响应分析法[S]． [14] 刘连睿，马继先，郭东升．应用频响法诊断变压器绕组变形的应用研究[J]．电网技术，1999，23(3)：35-39． Liu Lianrui，Ma Jixian，Guo Dongsheng．Diagnosis of transformer winding deformation with frequency response analysis[J]．Power System Technology，1999，23(3)：35-39(in Chinese)． [15] 岂小梅．变压器绕组变形的综合判断及经验总结[J]．电网技术，2006，30(25)：220-222． Qi Xiaomei．Synthetic diagnosis and experience about winding deformation of transformer[J]．Power System Technology，2006，30(25)：220-222(in Chinese)．

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