

国家重点基础研究项目

配电网的电能质量实时监测分析与治理仿真

姜中华, 罗安, 赵伟, 吴芳慈

湖南大学 电气与信息工程学院, 湖南省 长沙市 410082

摘要:

研究了一种配电网电能质量实时监测分析与治理仿真系统, 在准确、快速地检测和分析电能质量的基础上, 进一步提出了合理的治理措施并进行了实时仿真分析。系统硬件主要包括由数字信号处理器、A/D采样电路及工控机组成的电能质量在线监测与分析设备; 系统软件包括电能质量检测与分析、人机界面展现、支路选择与实时数据显示、电能质量治理仿真、历史数据查询等模块。采用复序列快速傅立叶变换(complex sequence fast Fourier transform, CSFFT)算法进行电能质量参数分析, 并提出了一种新的双谐振注入式混合型有源滤波器(hybrid active power filter with double-resonance injection circuit, DIHAPF)的治理方案。广西某110 kV变电站的应用效果证明了此方案的先进性和有效性。

关键词:

A Simulation System of Real-Time Power Quality Monitoring and Harmonic Suppression for Distribution Network

JIANG Zhong-hua, LUO An, ZHAO Wei, WU Fang-ci

School of Electrical and Information, Hunan University, Changsha 410082, Hunan Province, China

Abstract:

A simulation system of real-time power quality monitoring and harmonic suppression for distribution network is researched. On the basis of detecting and analyzing power quality rapidly and accurately, a rational harmonic suppression measure is given and related real-time simulative analysis is performed. The hardware for this simulation system is an on-line power quality monitoring and analysis device consisting of digital signal processor (DSP), A/D sampling circuit and industrial personal computer (IPC); the software of the simulation system includes such modes as power quality detection and analysis, man-machine interface, branch selection and real-time data display, harmonic suppression and historical data query. By use of complex sequence fast Fourier transform (CSFFT), the power quality parameters are analyzed and a new harmonic suppression scheme using hybrid active power filter with double-resonance injection circuit (DIHAPF) is proposed. Practical results of applying the proposed simulation system to a certain 110 kV substation in the Guangxi Zhuang Autonomous Region, China show the proposed simulation system is advanced and feasible.

Keywords:

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通讯作者: 姜中华

作者简介:

作者Email: jiang_zhong_hua@126.com

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