

基于三相旋转参考相量的并联有源电力滤波器谐波电流精确检测方法

韩学军¹, 刘万勋¹, 刘广平², 张根元³, 徐海利¹

1. 东北电力大学 电气工程学院, 吉林省 吉林市 132012; 2. 扶余农电有限公司, 吉林省 吉林市 131200; 3. 云南电力试验研究院, 云南省 昆明市 650051

收稿日期 2007-4-20 修回日期 网络版发布日期 2008-1-21 接受日期

摘要

基于瞬时无功功率理论, 建立了一个与电网电压同频率的单位对称基准旋转相量, 提出了一种运用APF精确检测谐波电流的方法。该方法利用对称基准旋转相量求解基波正序有功电流幅值, 并分别计算电压、电流与基准旋转相量相位差的正余弦值, 从而求出基波功率角, 消除检测基准旋转相量与电网电压的相位偏移。仿真结果验证了该方法的正确性, 表明该方法不需要检测基准旋转相量和电网电压的相位同步情况, 不仅适用于负载电流畸变且不对称的情况, 而且适用于电网电压畸变且不对称的情况。

关键词

[有源电力滤波器\(APF\)](#); [瞬时无功功率](#); [畸变电压](#); [谐波电流](#)

分类号 [TM711](#)

An Accurate Approach to Detect Harmonic Current by Use of Shunt Active Power Filter Based on Three-Phase Rotating Reference Phasors

HAN Xue-jun¹, LIU Wan-xun¹, LIU Guang-ping², ZHANG Gen-yuan³, XU Hai-li¹

1. College of Electrical Engineering, Northeast Dianli University, Jilin 132012, Jilin Province, China; 2. Fuyu Farm Power Co. Ltd., Jilin 131200, Jilin Province, China; 3. Yunnan Electric Experiment Research Center, Kunming 650051, Yunnan Province, China

Abstract

Based on the instantaneous reactive power theory, two groups of three-phase unit symmetrical rotating reference phasors with same frequency as that of power grid voltage is built and a novel approach to accurately detect harmonic currents by use of active power filter (APF) is proposed. By use of the built symmetrical rotating reference phasors, the amplitude of fundamental frequency positive- sequence active current is solved, and the sinusoidal and cosinusoidal phase difference values of power grid voltages and currents to rotating reference phasors are calculated respectively to solve the power angle, and the phase deviation between unit rotating reference phasors and power grid voltages is eliminated. Simulation results validates the correctness of the proposed approach and it show that it is not demanded to synchronize the phase of rotating reference phasors with that of power grid voltage, so the proposed approach is not only suitable to the condition that the load currents are distorted and unsymmetrical, but also to the condition that the voltage of power grid is distorted and unsymmetrical.

Key words [active power filter \(APF\)](#); [instantaneous reactive power](#); [distorted voltage](#); [harmonic currents](#)

DOI :

通讯作者 刘万勋 waxunzzdx@yahoo.com.cn

作者个人主页 韩学军¹; 刘万勋¹; 刘广平²; 张根元³; 徐海利¹

扩展功能
本文信息
▶ Supporting info
▶ PDF(OKB)
▶ [HTML全文](OKB)
▶ 参考文献[PDF]
▶ 参考文献
服务与反馈
▶ 把本文推荐给朋友
▶ 加入我的书架
▶ 加入引用管理器
▶ 复制索引
▶ Email Alert
▶ 文章反馈
▶ 浏览反馈信息
相关信息
▶ 本刊中 包含 “
有源电力滤波器(APF) ; 瞬时无功功率 ; 畸变电压 ; 谐波电流
” 的相关文章
▶ 本文作者相关文章
<ul style="list-style-type: none"> • 韩学军 • 刘万勋 • 刘广平 • 张根元 • 徐海利