

电机电工

基于简化p-q-r理论的统一电能质量调节器控制策略

谭智力 李勋 陈坚 康勇

华中科技大学电气与电子工程学院 华中科技大学电气与电子工程学院 华中科技大学电气与电子工程学院 华中科技大学电气与电子工程学院

摘要: 阐述了p-q-r瞬时功率理论的原理, 提出一种特殊情况下的简化p-q-r理论, 基于这一理论, 提出一种统一电能质量调节器(unified power quality conditioner, UPQC)的综合控制策略, 此策略综合了通常的直接控制策略和间接控制策略的特点。重点介绍了补偿电流及补偿电压的计算方法, 详细分析了控制策略的原理, 推导出p-q-r坐标下的相关运算公式, 给出了在该坐标轴上的详细控制框图。仿真结果显示, 将采用这种控制策略的UPQC用于补偿三相四线非线性及不平衡系统, 可以实现对负载谐波、无功及中线电流较好的补偿, 使负载获得额定端电压, 同时提高电源侧功率因数, 表明这种控制策略是可行、有效的。

关键词: 简化p-q-r理论 三相四线系统 统一电能质量调节器 综合控制策略

A New Control Strategy of UPQC by Using Simplified p-q-r Theory

TAN Zhi-li LI Xun CHEN Jian

Abstract: The p-q-r instantaneous power theory is introduced firstly, and then a simplified p-q-r theory is proposed under a special condition. Based on this theory, it presents a composite control strategy of unified power quality conditioner (UPQC), which is the combination of the ordinary direct and indirect control strategy. An algorithm of calculating the compensation current and the compensation voltage are introduced. A principle analysis of the proposed control strategy is described in particular. Meanwhile the control formulas on the p-q-r coordinate are deduced in detail. The control schematic diagram based on these formulas is presented. Simulation results show that, when the UPQC applying such control strategy is used for the compensation of the nonlinear and unbalance three-phase four-wire system, the harmonic current, reactive power of loads as well as neutral current are compensated well, load voltage get balanced and rated, power factor of power source is about unity, which verified the effectiveness of applying such control strategy in UPQC.

Keywords: simplified p-q-r theory three-phase four-wire system projection the composite control strategy

收稿日期 2006-07-20 修回日期 1900-01-01 网络版发布日期

DOI:

基金项目:

通讯作者: 谭智力

作者简介:

作者Email: tanzhicn@126.com; tanzhili@cug.edu.cn

参考文献:

本刊中的类似文章

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(555KB)
- ▶ [HTML全文]
- ▶ 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
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 简化p-q-r理论
- ▶ 三相四线系统
- ▶ 统一电能质量调节器
- ▶ 综合控制策略

本文作者相关文章

- ▶ 谭智力

PubMed

- ▶ Article by