

电机电工

一种高性价比并联混合有源电力滤波器

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摘要

分析了传统的并联混合型有源电力滤波器的优缺点,在此基础上提出一种新型的并联混合有源电力滤波器,其有源部分不承受基波电压和不流过基波无功电流,进一步减小了有源滤波部分的容量和逆变器直流侧电压,并兼具较大容量的无功静补偿能力。同时提出一种新的控制方法和控制器结构,控制系统由5个控制环组成。在控制电路中,5个反馈信号,即负载电流、电源电流、逆变器输出电流、电源电压和直流母线电压,计算逆变器的参考电压信号。为了证明提出的有源滤波器的性能,利用PSCAD/EMTDC进行了仿真验证,仿真和实验结果表明该装置滤波和无功补偿效果较好,而且这种混合有源电力滤波器的性能价格比较高,因而具有良好的工程推广应用价值。

关键词 [并联混合有源电力滤波器](#) [基波串联谐振电路](#) [直流侧母线电压](#) [无功补偿](#)

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Study of A Parallel Hybrid Active Power Filter With Good Cost Performance

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Abstract

Merits and demerits of conventional parallel hybrid active power filters are analyzed. On this basis a novel parallel hybrid active power filter (PHAPF) is proposed. Active part of proposed PHAPF does not bear fundamental component voltage and flow fundamental component reactive current, and converter rating and DC bus voltage can be reduced, and such a structure makes proposed PHAPF possessing higher static compensation capacity of reactive power. Novel control method and controller structures are also put forward, the control system consists of five control loops. Five feedback signals, namely load current, utility current, output current of power converter, utility voltage and DC bus voltage, are used in control circuit of proposed PHAPF to calculate reference voltage of power converter. To demonstrate the performance of proposed PHAPF, PSCAD/EMTDC simulation is given in the paper. Simulation and test results show that it is good in performances and in harmonics elimination, reactive power compensation. In addition, this facility is in favor of application due to its good cost performance.

Key words [parallel hybrid active power filter](#) [series fundamental resonance circuit](#) [DC bus voltage](#) [reactive power limit](#)

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