

电力系统

带耦合变压器的直流侧有源电力滤波器的仿真研究

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摘要:

提出了一种基于耦合变压器的直流侧串联型有源电力滤波器(active power filter, APF)。该APF通过一个耦合变压器与主电路相连。与不带变压器的直流侧串联型APF相比, 它可以灵活地、大范围地改变APF的输出电压, 从而充分利用开关器件的容量, 并且能够实现APF与主电路的绝缘隔离, 防止电力系统的各种干扰直接进入APF中; 与传统的交流侧串联型有源电力滤波器相比, 有源开关的数量减少了一半, 简化了电路结构, 降低了成本。理论分析及仿真结果验证了所提拓扑结构的正确性及优越性。

关键词: 有源电力滤波器 直流侧 变压器 串联型 谐波

Simulation Study on DC Side Series Active Power Filter Based on Coupling Transformer

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Abstract:

A new DC side series active power filter (APF) is proposed, in which the APF is connected to main circuit via a coupling transformer, which acts as transformer and reactor. Comparing with the APFs without transformer, the proposed APF can flexibly vary the output voltage in a wide range, thus the capacity of switching component can be fully utilized and the insulation isolation between the APF and main circuit is implemented to prevent the interferences from power system directly come into the APF. Besides, the number of active switch is reduced by half than that in traditional AC side APFs, thus the circuit structure is simplified and the cost is decreased. Results from theoretical analysis and simulation show that the proposed topological structure is correct.

Keywords: active power filter DC side transformer series type harmonics

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