

国家重点基础研究项目

注入式混合型有源电力滤波器的参数优化设计及其工程应用

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摘要:

分析了注入式混合型有源电力滤波器(injection type hybrid active power filter, IHAPF)的结构和工作原理,着重讨论了其主电路的参数优化设计;提出了一种无源滤波器的设计方法,既满足谐波治理要求又可确保装置的可靠运行;提出了基于粒子群算法的注入支路参数优化设计方法,在确保IHAPF谐波抑制能力的同时降低了电网谐波电压对装置可靠性的影响。针对某企业整流装置导致无功不足和谐波污染的实际工况,研制了一套IHAPF,仿真分析和工程应用表明,该IHAPF可以有效地进行谐波治理和无功补偿,满足了该企业的要求。

关键词:

Parameter Optimization Design for Injection Type Hybrid Active Power Filter and Its Engineering Application

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Abstract:

After analyzing the structure and working principle of injection-type hybrid active power filter (IHAPF), the optimum parameter design of its main circuit is emphatically researched. A design method for passive filter, which can meet the demand of harmonic elimination and ensure reliable operation of power filter, is proposed. A particle swarm optimization (PSO) algorithm based optimum parameter design method for injection circuit, which ensures the harmonic elimination ability of IHAPF and reduces the affect of harmonic voltage on power filter, is put forward. According to practical working condition of insufficiency of reactive power and harmonic pollution of a certain factory due to the rectifier circuit without power filter, an IHAPF device is developed. Simulation results and engineering application show that the designed IHAPF can effectively eliminate harmonics and compensate reactive power.

Keywords:

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