

电力系统

电力系统中谐波源的建模方法

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摘要:

电力系统中非线性负载的广泛使用使得谐波分析必不可少, 其中建立适当的模型来表征谐波源特性尤为重要, 结合相关文献综述了现有的各种谐波源模型, 并对其建模方法进行了分析、比较。考虑到支持向量机在高维数据模型构建中良好的泛化能力, 针对一个低压民用电器整流电路进行Matlab仿真获取训练数据, 并用最小二乘支持向量机(least squares support vector machine, LS-SVM)建模。结果表明模型输出谐波电流与实际仿真结果基本一致, 使用上述方法建立的模型精度高, 验证了最小二乘支持向量机是一种有效的谐波源建模方法。

关键词:

Modeling Approaches of Harmonic Sources in Power System

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Abstract:

Due to the widespread use of nonlinear loads in power system, the analysis on harmonics becomes indispensable, in which it is especially important to build proper models to characterize harmonic sources. In this paper, based on related research results, existing models of harmonic sources are reviewed and the modeling approaches are analyzed and compared. Considering good generalization ability of support vector machine (SVM) in the modeling of nonlinear high dimensional data, a low-voltage uncontrolled rectifier used in power electronic devices is used in the simulation by Matlab to obtain training data and it is modeled by least squares support vector machine (LS-SVM). Test results show that the output harmonic current of this model basically conforms to simulation results. The model built by above-mentioned method possesses high accuracy, and it is verified that LS-SVM is an effective modeling approach for harmonic sources.

Keywords:

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