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高电压技术

基于非对称规则采样策略的变换器传导干扰预测

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摘要：

提出了非对称规则采样策略下的变换器差模和共模干扰源预测模型，使用频域计算的方法推导了2种干扰源的频谱；总结了差模、共模干扰在变换器开关频率及其倍数频率附近的分布规律，从而对比研究了不同调制比下2种干扰的变化关系，得到了相应的变化规律。在此基础上，利用Saber软件对一个三相整流器系统的传导干扰进行了时域仿真和频域验证，仿真试验验证了理论预测的正确性。该方法可有效推广到逆变器干扰源的分析预测中。

关键词：　非对称规则采样　共模　差模　噪声源　频域分析

Prediction of Conducted Interference in Converter System Based on Asymmetric Regular Sampling Modulation

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Abstract:

Models to predict common mode (CM) and differential mode (DM) interference source of pulse width modulation (PWM) converter with asymmetric regular sampling modulationis are presented, and a direct calculation method in frequency domain is proposed to deduce frequency spectrums of DM and CM interference sources. The distribution regularities of DM and CM interferences around the switching frequency of converter and its multiple frequencies are summarized, and a comparative research on the variation relation of the two kinds of interferences under different modulation ratios is performed and corresponding variation law is attained. On this basis the time-domain simulation of the conducted electromagnetic interference (EMI) of a three-phase rectifier system is carried out by Saber software and Fourier analysis is applied to simulation results to observe and analyse the amplitudes of interferences at different frequencies to verify the correctness of the analysis results of proposed predictive model using the frequency domain theory. The correctness of theoretical prediction is validated by simulation test, thus the given modeling method could be extended to the analysis and prediction of interference source of three-phase PWM inverter.

Keywords: asymmetric regular sampling　common mode (CM)　differential mode (DM)　noise source　frequency domain analysis

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