**电力系统**

## 基于中国国家标准和IEC标准的谐波及间谐波测量方法

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**摘要：**

中国国家标准GB/T 17626.7—2008和IEC 61000-4-7: 2002标准推荐了新的谐波与间谐波测量方法。介绍了国家和IEC新标准推荐方法与传统谐波、间谐波检测方法的不同，从频谱泄漏、测量精度等角度分析了新方法的特点，针对其不足提出了改进措施。采用传统方法、新推荐方法及其改进方法，对多种典型信号进行了仿真测量。仿真结果表明，推荐方法适用于非平稳信号的谐波、间谐波测量，改进措施可以进一步保障各种情况下的测量精度。推荐方法及其改进方法与传统方法相比，更适于实际工程中的复杂谐波与间谐波的测量。

**关键词：**

## Harmonic and Interharmonic Measurement Methods Based on Chinese National Standard and IEC Standard

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Abstract:

A new harmonic and interharmonic measurement method is recommended by Chinese National Standard GB/T 17626.7-2008 and IEC 61000-4-7: 2002 standard. In this paper, the differences between traditional measuring methods for harmonics and interharmonics and the recommended method in new Chinese National Standard and IEC standard are presented. From the viewpoints of spectrum leakage and measurement accuracy the characteristics of recommended measuring method are analyzed and some improving measures to remedy the insufficiency of the recommended method are proposed. Simulation measurements of various typical signals are performed by traditional method, recommended method and its improving measures respectively. Simulation results show that the recommended method is suitable for the harmonic and interharmonic measurement of non-stationary signals, and the improving measures can further ensure the measurement accuracy under various conditions. The recommended method and its improving measures are more suitable for the measurement of complex harmonics and interharmonics in engineering practice.

Keywords:

**参考文献：**

[1] GB/T 14549—93 电能质量 公用电网谐波[S]． [2] IEC 61000-4-7：1991，Electromagnetic compatibility(EMC)，part 4-7： testing and measurement techniques-general guide on harmonics and interharmonics measurements and instrumentation，for power supply systems and equipment connected thereto[S]． [3] GB/T 17626.7—1998 电磁兼容 试验和测量技术供电系统及所连设备谐波、谐间波的测量和测量仪器导则[S]． [4] 林海雪．从IEC电磁兼容标准看电网谐波国家标准[J]．电网技术， 1999， 23(5)：64-67． Lin Haixue．On difference between national standard and IEC 61000 standards of EMC in harmonic[J]．Power System Technology，1999， 23(5)：64-67(in Chinese)． [5] 林海雪．电力系统

中的间谐波问题[J]．供用电，2001，18(3)：6-9． Lin Haixue．Interharmonics in electrical power system [J]．Distribution & Utilization，2001，18(3)：6-9(in Chinese)． [6] 林海雪．公用电网谐波国标中的几个问题[J]．电网技术，2003，27(1)：65-70． Lin Haixue．Some problems in national standard for harmonics inpublic supply network[J]．Power System Technology，2003，27(1)： 65-70(in Chinese)． [7] 林海雪．英国电气协会工程导则G5/4评述[J]．电网技术，2006， 30(13)：90-93． Lin Haixue．Review for the engineering recommendation G5/4 by electricity association in the UK[J]．Power System Technology，2006，30(13)：90-93(in Chinese)． [8] 解绍锋，李群湛，赵丽平．谐波国家标准有关问题的探讨[J]．电网技术，2006，30(13)：94-97． Xie Shaofeng，Li Qunzhan，Zhao Liping．Some discussion of state standard of harmonics[J]．Power System Technology，2006，30(13)： 94-97(in Chinese)． [9] 林海雪．国外谐波测量标准的新进展[J]．供用电，2008，25(6)：13-16． Lin Haixue．Latest progress on foreign harmonic measurement standards [J]．Distribution & Utilization，2008，25(6)：13-16(in Chinese)． [10] 林海雪．国际电工委员会谐波标准简介[J]．中国电力，1998，31(10)： 55-58． Lin Haixue．A brief introduction to IEC harmonic standard[J]．Electric Power in China，1998，31(10)：55-58(in Chinese)． [11] Andria G，Savino M，Trotta A．Windows and interpolation algorithms to improve electric measurement accuracy[J]．IEEE Transaction on Instrument and Measurement，1989，38(8)：856-863． [12] 张伏生，耿中行，葛耀中．电力系统谐波分析的高精度FFT算法[J]．中国电机工程学报，1999，19(3)：63-66． Zhang Fusheng，Geng Zhongxing，Ge Yaozhong．FFT algorithm with high accuracy for harmonic analysis in power system[J]．Proceedings of the CSEE，1999，19(3)：63-66(in Chinese)． [13] 黄纯，江亚群．谐波分析的加窗插值改进算法[J]．中国电机工程学报，2005，25(15)：26-32． Huang Chun，Jiang Yaqun．Improved window and interpolation algorithm for analysis of power system harmonics[J]．Proceedings of the CSEE，2005，25(15)：26-32(in Chinese)． [14] 钱昊，赵荣祥．基于插值FFT算法的间谐波分析[J]．中国电机工程学报，2005，25(21)：87-91． Qian Hao，Zhao Rongxiang．Interharmonics analysis based on interpolition FFT algorithm[J]．Proceedings of the CSEE，2005，25(21)：87-91(in Chinese)． [15] 庞浩，李东霞，俎云霄，等．应用FFT进行电力系统谐波分析的改进算法[J]．中国电机工程学报，2003，23(6)：50-54． Pang Hao，Li Dongxia，Zu Yunxiao，et al．An improved algorithm for harmonic analysis of power system using FFT technique [J]．Proceedings of the CSEE，2003，23(6)：50-54(in Chinese)． [16] 门长有，王荣华，谭年熊．一种用于谐波测量的全数字同步采样算法[J]．电力系统自动化，2008，32(22)：83-86． Men Changyou，Wang Ronghua，Tan Nianxiong．An entire digital synchronous sampling algorithm for harmonic measurements [J]．Automation of Electric Power Systems，2008，32(22)：83-86(in Chinese)． [17] 黄纯，彭建春，刘光晔，等．周期电气信号测量中软件同步采样方法的研究[J]．电工技术学报，2004，19(1)：75-79． Huang Chun，Peng Jianchun，Liu Guangye，et al．Research on software synchronous sampling in measurement of period electric signals[J]．Transactions of China Electrotechnical Society，2004，19(1)：75-79(in Chinese)． [18] 于海生，潘松峰，吴贺荣．基于复序列FFT和锁相原理的电参数测量[J]．电网技术，2000，24(3)：59-61． Yu Haisheng，Pan Songfeng，Wu Herong．Measurement of electrical parameters based on complex sequence FFT and phase locking principle [J]．Power System Technology，2000，24(3)：59-61(in Chinese)． [19] IEC 61000-4-7:2002，Electromagnetic compatibility(EMC)，part 4-7：testing and measurement techniques-general guide on harmonics and interharmonics measurements and instrumentation，for power supply systems and equipment connected thereto[S]． [20] GB/T 17626.7—2008 电磁兼容 试验和测量技术供电系统及所连设备谐波、间谐波的测量和测量仪器导则[S]．

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