



## 激光陀螺信号解调中自适应滤波器的设计

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基金项目：

摘要：

在激光陀螺信号解调领域中，在满足高精度的前提下如何降低滤波器的延迟一直是相关院所的研究重点。针对此问题，本文研究了一种新的激光陀螺滤波处理的方法。这种方法采用LMS自适应滤波器原理，分别把机械抖动抖反馈信号作为滤波器的基本输入，把机抖信号、随机噪声和白噪声作为滤波器的参考信号，然后通过FPGA进行数字滤波以及外围控制，最后给出了滤波器的算法实现以及硬件框图。实验结果表明，LMS自适应滤波器有很好的解调效果，经过滤波后的计数值差值在 $\pm 1$ 个数以内，且延时为1ms。

关键词：激光陀螺；抖动解调；自适应滤波器；FPGA数字滤波

## Design of Adaptive Filter Based on Laser gyroscope Signal Demodulate

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**Abstract:**

In the area of Ring Laser Gyro (RLG) dither stripping, how to reduce the group delay of RLG filter at the premise of high accuracy is one of the most important works that many relative universities and the research departments are undertaking. We put forward a new dither stripping method for RLG. The principle of LMS adaptive filter was used, the mechanical dithered feedback signal were taken respectively as the basic input, and the mechanical dithered signal, random noise, white noise were regarded as the reference signal, then filter algorithm and control unit were completed in the XILINX FPGA. Experimental results show that LMS adaptive filter has a wonderful result for the RLG dither stripping, residual count of RLG can be controlled within  $\pm 1$  after filtering, and only 1 ms of delay.

**Keywords:** laser gyro; dither stripping; LMS adaptive filter; FPGA digital signal process

投稿时间：2013-08-18

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