

基于驱动频率的硅微陀螺零偏补偿方法研究

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摘要：

硅微陀螺的零偏随环境温度变化较大, 严重影响到硅微陀螺的使用精度和性能, 需要对其进行温度补偿。研究了驱动频率的温度特性, 发现驱动频率与温度之间存在很好的线性关系, 经过适当的标定, 驱动频率可以作为内置温度传感器取代传统的温度传感器。最后利用驱动频率与零偏的关系对硅微陀螺的零偏进行了补偿验证。补偿后, 在-40℃~80℃范围内, 硅微陀螺零偏的波动范围变小, 温度灵敏度降低了一个数量级, 硅微陀螺性能提升明显。

关键词：硅微陀螺; 零偏; 驱动频率; 温度补偿

Research on the Closed-loop Driving Method of the Capacitive Microgyroscope

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Abstract:

The bias of silicon micromachined gyroscope change greatly with the environment temperature which effect the precision and performance of the gyroscope badly, it is necessary to carry out research on temperature compensation. By Research on the characteristics of drive frequency, the perfect linear relation between drive frequency and temperature is found. Consequently, with some calibration, the drive frequency can be used as a gauge of the inner temperature of gyroscope chip. In the end, take compensation verification on the bias of silicon micromachined gyroscope by use of the relation of drive frequency and bias. After compensation, the bias fluctuation range change narrowly in the whole temperature, and the temperature sensitivity reduce by one order of magnitude and the performance improve obviously.

Keywords: Silicon micromachined gyroscope, bias, drive frequency, temperature compensation

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