

MEMS微机械陀螺温度特性分析与建模

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摘要:

针对MEMS微机械陀螺的零偏随温度变化波动较大的特性, 通过建立MEMS陀螺零偏随温度变化之间的误差模型, 在温度范围为 -20°C ~ 60°C 温箱试验下, 分析MEMS陀螺的零偏输出变化, 经去除野值后使用建立的误差模型对零偏进行补偿, 结果表明, MEMS陀螺仪因温度引起的零偏从最大约为 $160^{\circ}/\text{h}$, 经补偿后降至约为 $10^{\circ}/\text{h}$ 。该温度误差模型使MEMS陀螺的全温区零偏特性得到了一定程度的提升, 为提高之后的导航精度打下基础, 具有一定的工程价值。

关键词: MEMS 陀螺; 温度特性; 零偏; 误差补偿

Analyzing and Modeling of the Thermal Characteristics about MEMS Gyroscope

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Abstract:

For MEMS gyroscopes, biases characteristics always vary with temperature fluctuations. Through establishing error model between the temperature and the MEMS gyroscope biases, with a temperature range of -20°C ~ 60°C , studying on the biases outputs of the MEMS gyroscope. Via using the error model after removing outliers, results show that MEMS gyroscope biases caused by temperature have changed from approximately $100^{\circ}/\text{h}$ to approximately $10^{\circ}/\text{h}$ after compensations. Also biases in the whole temperature rang have been improved to some extent, which would lay a foundation for improving the navigation accuracy.

Keywords: MEMS gyroscopes; thermal characteristics; biases; error compensations

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