

一种MEMS加速度计温度模型辨识及温度补偿方法

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摘要:

对MEMS加速度计的温度模型与其倾角的相关性进行分析, 提出了一种无需精确控制加速度计位置, 借助普通恒温箱即可完成的温度模型辨识方法, 并根据辨识结果设计温度补偿软件方案。实验结果表明, 温度补偿可使加速度计测量输出的稳定性提高一个数量级, 补偿效果明显, 模型辨识方法有效。将温度模型用于某小型无人机航姿测量系统中, 缩短了系统启动时间, 并有效的提高了姿态测量精度。

关键词: 微机电系统; 加速度计; 温度补偿; 模型辨识

A Method of Identification of Temperature Model and Temperature Compensation for the MEMS Accelerometer

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Abstract:

The relationship between the temperature model and the tilt angle of MEMS accelerometer is analyzed in this paper. A method to identify the temperature model without placing the accelerometer in some precise angle is proposed, which is realized only with a common temperature box. According to the temperature model, the temperature compensation software is designed. Experimental results show the measure stability of the accelerometer increases by one order of magnitude and the method proposed is effective. The temperature model has been used in a system for measuring heading and attitude of some MUA V(Micro-Unmanned Air Vehicle), which reduces start-up period and improves the precision of attitude measurement.

Keywords: MEMS; accelerometer; temperature compensation; identification for the model

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