应用光学 2010, 31(4) 549-552 DOI: ISSN: 1002-2082 CN: 61-1171/O4

光电系统与工程

Q-MEMS陀螺零偏补偿技术研究

张琬琳[1];尹剑[1];郭栓运[1];康臻[1];袁晓莹[1];赵永昌[2]

1.西安应用光学研究所,陕西西安710065;2.西安机电信息研究所，陕西西安710065

摘要：

在对某型Q-MEMS(石英音叉陀螺)进行大量高低温环境试验的基础上，根据试验数据，建立了一种基于陀螺工作时间的零偏温度补偿模型，并用该模型对新测的试验数据进行了预测补偿。补偿结果表明：Q-MEMS陀螺经该模型补偿后可以将零偏减小至少一个数量级，并进一步提高了零偏稳定性，有效补偿了陀螺上电后的启动漂移，完全满足工程上的实时补偿要求。因此，该模型具有很强的工程实用价值。

关键词： 石英音叉陀螺 零偏 温度补偿

Temperature compensation for Q-MEMS gyro

ZHANG Wan-lin[1]; YIN Jian[1]; GUO Shuan-yun[1]; KANG Zhen[1]; YUAN Xiao;ying[1];ZHAO Yong-chang[2]

1.Xi'an Institute of Applied Optics, Xi'an 710065, China;
2.Xi'an Institute of Electromechanical Information Technology,Xi'an 710065,China

Abstract:

Based on a lot of temperature experiments of Q-MEMS gyro, a novel temperature compensation model based on operation time is established according to the experiment data. The compensation prediction is performed to the new experimental data, and the results of compensations show that the bias is reduced to at least one tenth of the original. And the bias stability is also enhanced. The model can meet the requirement of real time compensation and can be used in the application of Q-MEMS gyro.

Keywords: Q-MEMS gyro bias temperature compensation

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者: 张琬琳(1986-)，女，江苏宿迁人，硕士研究生，主要从事微机械惯性仪表及控制技术的研究工作。

作者简介:

作者Email: zhangwanlin12216@163.com

参考文献：

［1］杨培根, 龚智炳. 光电惯性技术［M］.北京:兵器工业出版社,1999:195-199.
YANG Pei-gen, GONG Zhi-bing. Photoelectricity inertial technology［M］.Beijing: Ordnance Industry Press,1999:195-199. (in Chinese)
［2］郭栓运, 梁庆仟, 袁晓莹. 寻北仪系统光线陀螺误差建模技术研究［J］. 应用光学,2007,28(8):101-104.
GUO Shuan-yun, LIANG Qing-qian, YUAN Xiao-ying. Modeling technology of fiber gyroscope error for

north finding system［J］. Journal of Applied Optics,2007,28(8):101-104. (in Chinese with an English abstract)
［3］赵小宁,李县洛,雷宝权.激光陀螺零偏温度补偿研究［J］.中国惯性技术学报, 2004,12(3):55-57.
ZHAO Xiao-ning, LI Xian-luo, LEI Bao-quan. Temperature compensation for ring laser gyro［J］. Journal of Chinese Inertial Technology, 2004,12(3):55-57. (in Chinese with an English abstract)
［4］徐丽娜,邓正隆,张广莹.陀螺仪温度试验与建模研究［J］.宇航学报,1999,20(2):99-103.
XU Li-na, DENG Zheng-long, ZHANG Guang-ying. Temperature test and modeling research of gyroscope［J］. Journal of Astronautics, 1999,20(2):99-103. (in Chinese with an English abstract)
［5］HONG K S. Compensation of nonlinear thermal bias drift of resonant rate sensor using fuzzy logic［J］. Sensors and Actuators, 1999,78(10):143-148.
［6］王海.光纤陀螺温度影响与误差补偿［J］. 北京航空航天大学学报,2007,33(5):549-551.
WANG Hai. Affects of temperature and error compensation for fiber optic gyro［J］. Journal of Beijing University of Aeronautics and Astronautics, 2007,33(5):549-551. (in Chinese with an English abstract)
［7］张桂才,杨清生. 干涉式光纤陀螺的温度特性研究［J］. 光电子技术与信息,2001,14(1):17-22.
ZHANG Gui-cai, YANG Qing-sheng. Study on temperature characteristics of interferometric fiber-optic gyro［J］. Opto-electronic Technology & Information, 2001,14(1):17-22. (in Chinese with an English abstract)

本刊中的类似文章

1. 魏鹏;李丽君;郭俊强;初艳玲.光纤Bragg光栅应力传感中温度交叉敏感问题研究[J]. 应用光学, 2008,29(1): 105-109
2. 胡志新, 王震武, 马云宾, 张君.温度补偿式光纤光栅土压力传感器[J]. 应用光学, 2010,31(1): 110-113
