

三视场天文导航视场间星图识别的导航星选取

吴量^{1,2}, 王建立¹, 王昊京¹

1. 中国科学院 长春光学精密机械与物理研究所, 吉林 长春 130033;
2. 中国科学院大学, 北京 100039

Guide star selection for star pattern recognition between three FOVs

WU Liang^{1,2}, WANG Jian-li¹, WANG Hao-jing¹

1. Changchun Institute of Optics, Fine Mechanics and physics, Chinese Academy of Sciences, Changchun 130033, China;
2. University of Chinese Academy of Sciences, Beijing 100039, China

摘要

图/表

参考文献

相关文章 (12)

全文: PDF (1881 KB) RICH HTML ^{NEW}

输出: BibTeX | EndNote (RIS)

摘要 研究了三视场天文导航视场间导航星的选取方法,以提高其视场间星图识别的效率,减小识别特征数据库规模.根据三视场天文导航星图识别的特点,分析了导航视场间导航星数目对视场间三角形星图识别的影响.考虑视场间三角形星图识别的需求,给出了任意视场至少包含1颗导航星和亮星优先选取的视场间导航星选取准则.然后,遵从上述准则提出了一种基于星等优先的一阶自组织导航星选取算法.利用提出的算法制备了视场间导航星星库,并对该导航星星库的性能进行了仿真分析和外场实验.实验结果表明:使用该算法制备的导航星星库规模较星等阈值过滤方法制备的星库规模降低了53.91%,且库中导航星分布均匀,符合视场间导航星的要求。

关键词 : 天文导航, 三视场, 星图识别, 导航星选取

Abstract : A guide star selection algorithm for the three Field of View(FOV) navigation system was proposed to increase the efficiency of the star pattern recognition between three FOVs, and to decrease the size of a guide star database. According to the characteristics of star pattern recognition for three FOV navigation system, the influence of the number of guide stars between three FOVs on the triangle star pattern recognition was analyzed. According to the requirement of triangle star pattern recognition between FOVs, the guide star selection principle, one guide star at least is inside the FOV and the brighter star can be selected in priority, was presented. Then the 1st order self-organizing guide star selection algorithm based on the principle magnitude mentioned above was proposed. A guide star database between FOVs was established based on the proposed algorithm, and the simulation analysis and field experiments of the capability of the guide star database were performed. Experimental results indicate that the number of the guide stars in the database selected by this method have reduced by 53.91% compared with that of the visual magnitude threshold method and the guide stars in the database show uniform distribution. It satisfies the guide star selection requirement of the star pattern recognition between FOVs in celestial navigation systems.

Key words : celestial navigation three FOVs star pattern recognition guide star selection

收稿日期: 2014-07-25

中图分类号: TP391.4

V249.323

基金资助:国防科技创新基金资助项目(No.CXJJ-10-M53)

作者简介: 吴量(1987-),男,吉林长春人,博士研究生,2010年于电子科技大学获得学士学位,主要从事天文导航、模式识别等方面研究.E-mail:624989202@qq.com 王建立(1971-),男,山东曲阜人,博士,研究员,博士生导师,主要从事空间目标探测技术和地基高分辨率成像望远镜总体技术等方面的研究.E-mail:wangjianli@ciomp.ac.cn

引用本文:

吴量, 王建立, 王昊京. 三视场天文导航视场间星图识别的导航星选取[J]. 光学精密工程, 2015, 23(6): 1732-1741. WU Liang, WANG Jian-li, WANG Hao-jing. Guide star selection for star pattern recognition between three FOVs. Editorial Office of Optics and Precision Engineering, 2015, 23(6): 1732-1741.

链接本文:

<http://www.eope.net/CN/10.3788/OPE.20152306.1732> 或 <http://www.eope.net/CN/Y2015/V23/I6/1732>

服务

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ E-mail Alert
- ▶ RSS

作者相关文章

- ▶ 吴量
- ▶ 王建立
- ▶ 王昊京

访问总数:6358188

版权所有 © 2012《光学精密工程》编辑部

地址:长春市东南湖大路3888号 邮编:130033 E-mail: gxjmgc@sina.com

本系统由北京玛格泰克科技发展有限公司设计开发

