

光电系统与工程

大型地面测量设备动态检测装置的设计

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摘要:

大型地面跟踪测量设备的跟踪性能、测角精度、等技术指标对顺利完成测控任务均有重要影响, 因此为及时对设备能否满足指标给出准确和定量的判断, 设计了适应大型跟踪测绘设备进行动态检测的动态检测装置。文章介绍了实验室条件下动态检测的基本原理, 并对空间模拟光学目标的运动轨迹进行了仿真分析。以工程化的设计结果为基础, 对检测装置的实际精度进行了分析与计算, 最终得到了动态检测设备目标角晃动 (RMS,1σ) 优于5"的结论, 设备的精度可以满足大型跟踪测绘设备进行实验室条件下的高精度动态检测。

关键词: 地面跟踪测绘设备 动态测角精度标校系统 轴系误差 目标晃动

Design of dynamic testing device for large ground-based measuring equipment

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Abstract:

Optical tracking device is one of the major ground based measurement instrument in target field mapping system. Its main function is to stably track various targets such as flying object and spacecraft. The instrument can accurately measure and record these tracks and flight attitude. Since the instrument is a precise optical device, its technical specifications such as tracking performance, angle measurement accuracy and image quality have a great impact on the successful completion of the measurement. In order to timely detect problems in the device and ensure the effective monitoring, we have developed a dynamic testing device. This paper introduces the basic principle of dynamic testing in laboratory conditions, and the simulation results are provided. The analysis and calculation for the actual accuracy of the detection device are carried out based on engineering design. Finally, It is concluded that the target angle error better than 5" (RMS,1σ) is achieved and the new design can meet high-precision dynamic testing requirement in laboratory conditions.

Keywords: ground tracking and mapping equipment dynamic angle measurement and calibration system axis misalignment target sway

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