

论文

激光跟踪仪检验非球面面形的方法

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摘要:

通过扩充激光跟踪仪的现有功能,提出了一种适用于非球面研磨和粗抛光阶段以及中低准确度非球面面形的快速检测方法.分析了测试原理,设计规划了检测流程.利用激光跟踪仪的靶标球对非球面表面进行多点接触测量,并将测量的结果与非球面CAD模型进行分析对比、处理和运算,获得非球面的面形分布信息.结合实例对一口径为420 mm×270 mm的离轴非球面进行了面形检测,并与零位补偿结果进行对比,结果表明,两种方法测试的面形误差分布是一致的,其峰值值和均方根值的相对偏差分别仅为6.22%和3.37%.该方法无需其它辅助光学元件就能够准确地实现对大口径非球面面形的检测,测试数据处理和数学运算简单,实验操作简单易行.

关键词: 光学检测 非球面 面形误差 激光跟踪仪

Measurement of Aspherical Surfaces by Laser Tracker

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Abstract:

In order to test middle and low precision asphere and measurement of asphere during grinding and polishing, a new method by extending the ability of laser tracker is proposed. The testing principle is analyzed, and the testing procedure is devised. The coordinate of several points on the tested asphere can be measured by the laser tracker, and the figure error can be calculated by analyzing the testing data and CAD model of the asphere. An off-axial aspheric surface with the aperture of 420 mm×270 mm is measured by this method, the surface map by this method is consistent to the entire surface map from the null test, and the relative error of the PV and RMS error between null test and this method is 6.22% and 3.37%, respectively. The proposed method provides another quantitative measurement for testing large aperture aspheres without any assistant optics, and the data processing and testing operation are very convenient.

Keywords: Optical testing Aspherical surface Figure error Laser tracker

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