



纳米三坐标测量机模拟接触式探头的标定

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摘要：

三坐标测量机的高精度模拟接触式探头在计算探头球尖位移与传感器输出的关系时需要空间坐标转换模型与标定参数。标定方法基于自己研发的模拟接触式探头，该探头由带有光纤球头的金属丝悬浮机构，二维角度传感器，小型迈克尔逊干涉仪组成。通过空间坐标转换，矩阵计算模型和标定实验的建立，重点描述了一种特定的标定方法与标定了模型的未知参数。实验结果表明三坐标测量机在xyz三方向上测量的标定值与实际值的位移误差的标准差小于30nm，证明该方法具有一定的可行性与有效性。

关键词：模拟探头，DVD激光读取头，标定，纳米三坐标测量机

Calibration of an Analogue Contact Probe for Nano-Coordinate Measurement Machines (CMM)

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Abstract:

High-precision analogue contact probe for Micro/Nano-Coordinate Measurement Machines (CMM) requires modeling and calibration parameters when calculating the displacement of the ball tip with respect to the sensors' output. This paper presents the transformation model which is based on the self-developed analogue contact probe, and the probe is composed of a fiber stylus with ball tip, a mechanism with wire-suspended floating plate, a two-dimensional angle sensor and a miniature Michelson interferometer. Through space coordinate transformation, the matrix computational model and the calibration experiment, the emphasis is upon the description of the specific calibration method and the calibration of unknown parameters. The calibration experiment results show that the standard deviation of the error between calibration values and actual values in xyz axes are below 30nm, and the feasibility and effectiveness of the calibration method have been proved by the experiment.

Keywords: Analogue probe, DVD pick-up head, Calibration, Micro/nano-coordinate measurement machine

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