


Original Article

Test Specific Uncertainty Analysis of Zirconia-Dolerite Ball Plate by Monte Carlo Simulation

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Abstract

An improvised Zirconia-Dolerite ball plate artefact is manufactured, which computes different geometric errors of CMM in three different plane positions (XY , YZ and ZX). Uncertainty measurement of this artefact will affect calibration of CMM. CMM undergoing periodic interim checks by ball plate measurement needs to compute uncertainty analysis over a calibration period. This requires repetitive measurements of artefact, involving great measurement cost. An attempt has been made in this research work to devise Monte Carlo framework (MCF) for analyzing the uncertainty of ball plate measurement. The presented MCF requires less repetitive measurement at actual. This work also made possible to find preferable zones of measuring areas of CMM including volumetric measurement, explaining novelty of the research work. In the present test specific CMM, demonstrated MCF recommends seldom use of lower left corner of CMM.

Keywords

Normal; 3-Parameter Weibull; Random numbers; Monte Carlo simulation