



Separation of machine errors, probe errors and roundness errors using multistep method

L. LAAOUINA

Laboratory of Advanced Mechanics Research and Industrial Applications, ENSAM, BP 4024, Meknes Ismailia, Morocco

E-mail : loubna.laaouina@ gmail.com

Abstract:

The performance verification of coordinate measuring machines (CMMs) is an important and challenging research topic, because of their mission within companies to measure and verify dimensional quality of manufactured parts and products. Several sources of errors affect the accuracy of CMMs such as probe errors and machine errors that include dynamic and kinematics errors. The measurement of the roundness error on a CMM is always affected by probe errors and errors related to the machine axes. From a cloud of points taken on one circle of the measured workpiece, the software calculates the parameters of the measured element and estimate the value of the roundness error. It could be very important to have probe error and machine error in order to take decision about the conformity of the workpiece. Error separation techniques are widely used on roundness metrology to decouple roundness errors from a measuring system.

This study presents an application of multi-step method on a CMM for the separation of roundness errors of a test ring, probe errors and also machine errors. The proposed method is based on redundancy measurement of a test ring by following several configuration of the test ring and the probe system.

The developed approach is tested in the laboratory and the results are confirmed by performing a validation test. It provides a measurement of the test ring's roundness with high accuracy separately from the probe errors and machine errors. The machine errors and probe errors identified gives also useful information for remedial action if necessary.

†L. LAAOUINA, A.NAFI, A.MOUCHTACHI

Contribution:

Oral