1. Record Nr. UNINA9910464314003321

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Titolo	Measurement and monitoring / / Vytautis Giniotis and Anthony Hope
Pubbl/distr/stampa	New York : , : Momentum Press, LLC, , [2014] ©2014
ISBN	1-78684-359-5 1-60650-381-2
Descrizione fisica	1 online resource (210 p.)
Collana	Automation and control collection
Disciplina	389.1015195
Soggetti	Metrology Electric machinery - Monitoring Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	1. Monitoring of processes, systems, and equipment -- 1.1 Introduction -- 1.2 Parameters for system monitoring -- 1.3 Random and regular modes of monitoring -- 1.4 Principles of performance of information measuring systems -- 2. Testing of geometrical accuracy parameters of machines -- 2.1 Geometrical accuracy parameters of machines and instruments -- 2.2 Accuracy control of geometrical parameters -- 2.2.1 Length (positioning) measurement -- 2.2.2 Inversion method in measurements -- 2.3 Testing of accuracy parameters of the rotary table -- 3. Measurement and monitoring of the accuracy of scales and encoders -- 3.1 Standards of measurement of length and angle -- 3.2 Measurement of circular scales -- 3.3 Applying new methods for measuring circular scales -- 3.4 Measurement of linear scales and transducers -- 3.5 Comparators for linear measurements -- 3.6 Comparators for angle measurements -- 3.7 Calibration of geodetic instruments -- 3.7.1 Methods and means for vertical angle calibration -- 4. Control of nano-displacement and position -- 4.1 Accuracy control of the position and displacement of machine parts -- 4.1.1 The elements of position and displacement -- 4.2 Measurement of

nanometric parameters -- 4.3 Linear and circular piezoelectric actuators for the nanometric displacement --
5. Testing and calibration of coordinate measuring machines -- 5.1 Introduction to principles of operation and application of CMMs -- 5.2 Principles of MHs and touch trigger probes -- 5.3 Performance verification of MHs and touch trigger probes -- 5.4 Complex accuracy verification of CMMs -- 5.5 Performance verification using artifacts -- 5.6 Performance verification using lasers -- 5.7 Methods and means for accuracy improvement of machines -- 5.7.1 Piezomechanical correction --
6. Future trends in machine monitoring and performance verification of coordinate measuring machines -- 6.1 Introduction -- 6.2 The determination of physical surface coordinates using a CCD camera -- 6.3 Volumetric detection of position -- 6.4 A proposed telemetric CMM --
References -- Bibliography -- Index.

Sommario/riassunto

This book presents the main methods and techniques for measuring and monitoring the accuracy of geometrical parameters of precision Computer Numerically Controlled (CNC) and automated machines, including modern coordinate measuring machines (CMMs). Standard methods and means of testing are discussed, together with methods newly developed and tested by the authors. Various parameters, such as straightness, perpendicularity, flatness, pitch, yaw, roll, and so on, are introduced and the principal processes for measurement of these parameters are explained. Lists and tables of geometrical accuracy parameters, together with diagrams of arrangements for their control and evaluation of measurement results, are added. Special methods and some original new devices for measurement and monitoring are also presented. Information measuring systems, consisting of laser interferometers, photoelectric raster encoders or scales, and so on, are discussed and methods for the measurement and testing of circular scales, length scales, and encoders are included. Particular attention is given to the analysis of ISO written standards of accuracy control, terms and definitions, and methods for evaluation of the measurement results during performance verification. Methods for measuring small lengths, gaps, and distances between two surfaces are also presented. The resolution of measurement remains very high, at least within the range 0.05 [mu]m to 0.005 [mu]m.