Precision Optical Measurements and Instrumentation for Geometrical and Mechanical Quantities

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Measurement and instrumentation have long played an important role in production and manufacturing engineering, through supporting both the traditional field of manufacturing and the new field of micro/nanotechnology. Precision measurement and instrumentation have gained much greater prominence in the last decade in the areas of high-precision production and manufacturing, and thus the development of new and improved high-precision processes and machines. Many advanced technology products depend entirely on one or more components being manufactured to tolerances or dimensions in the micro- or even nanotechnology range. This special section serves as a forum to share the latest advances of optical-based precision measurement and instrumentation in high-precision production and manufacturing engineering, and other related fields.

Several of the papers in this special section were presented at the International Symposium on Precision Engineering Measurement and Instrumentation (ISPEMI 2012). Others were submitted in response to the general call for papers. All submissions underwent strict peer review.

This special section comprises thirteen papers that cover microscopic measurement, profile measurement, optical property measurement, vision measurement, optical sensors, and signal processing. Many advanced technologies are introduced, such as the chromatic confocal profilometry for full-field measurement of micro-objects, absolute distance measurement based on a femtosecond pulse laser, fast and accurate shape measurement by structured light, real-time moving body measurement, and microprobe for micro/nanocoordinate measuring machines. We hope that all of these papers can be beneficial to readers of Optical Engineering and worldwide researchers.
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