



Non-invasive microtopographic inspection of rough surfaces by optical triangulation

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Non-invasive dimensional characterization of objects and surfaces is an issue of utmost importance in R&D and in a wide range of industries. Roughness characterization and the integral reproduction or inspection of the three dimensional structure of surface's relief is needed. In the industry the strict control of the production process requires an in-depth knowledge of the microtopographic characteristics of the surfaces of every material or parts used in all production phases. Most of the surfaces involved are optically rough in a range of diverse shapes and types: from hard stable, to soft ones with very little self-consistency; with random height distributions or clearly anisotropic; formed by just one component or conformed by regions made of different materials. Furthermore different types of inspection tasks must to be performed with higher or lower resolution and or dynamic range requirements, but always reliably and in a fast and inexpensive way. Optical triangulation in different approaches allow the establishment of metrological systems that by its inherent relative simplicity robustness and reliability can cope with most modern requirements of the non-invasive inspection of objects and surfaces both smooth or rough. In this communication we will present a brief review of the work done at the Microtopography Laboratory of the Physics Department of the University of Minho, Portugal, on the development of methods and systems of optical triangulation based microtopographic inspection of surfaces.