Simulation and experiments of material-oriented ultra-precision machining

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Abstrak

Ultra-precision machining is a promising solution for achieving excellent machined surface quality and sophisticated micro/nano-structures that influence the applications of components and devices. Further, given the ultrathin layer of material removed, it is a highly coupled process between cutting tool and material.

In this book, scientists in the fields of mechanical engineering and materials science from China, Ukraine, Japan, Singapore present their latest research findings regarding the simulation and experiment of material-oriented ultra-precision machining. Covering various machining methods (cutting, grinding, polishing, ion beam and laser machining) and materials (metal, semiconductor and hard-brittle ceramics), it mainly focuses on the evaluation of the fundamental mechanisms and their implementation in processing optimization for different materials. It is of significant theoretical and practical value for guiding the fabrication of ultra-smooth and functional surfaces using ultra-precision machining.