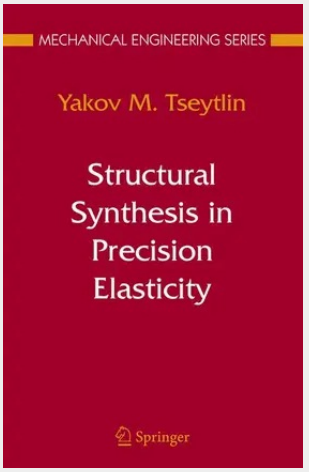
Tseytlin

Structural Synthesis in Precision Elasticity



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Structural Synthesis in Precision Elasticity reflects the summary of theoretical and experimental studies whose conclusions are effective for optimized structural synthesis in precision elasticity, as well as demonstrate a large experience and options in the synthesis, production, application of precision elastic guides, mechanisms, correctors, transducers, instruments and machines. The main focus of this book is in the possible simplification of the corresponding analytical apparatus by using kinematical equivalents, matrix methods, appropriate contours, and function expansion with enough accurate minimal polynomials. This approach allows for substitution of some known unwieldy formulae and methods that are not convenient for digestible and tractable synthesis.

The book consists of two main parts:

- The elastic systems functional analysis and structural synthesis methods, including effective approximations and references to the history of their development

- The application and development of precision functional elastic systems at reference and operating conditions, including the observation of archives with effective synthesized structures and elements of nanotechnology.

Each part provides theoretical basics and a large variety of examples and recommendations. This book gives theoretical and practical tools to researchers, precision machines, instruments and miniature systems designers, engineers, metrologists, and engineering students.

Despite that this book is dedicated to the general problems of the structural synthesis in precision elasticity, most of the practical examples and applications are concerned with the measuring systems as the precision is their main goal.

The author intends to show close connection between the elastic precision structures developed during the 20th century and even before and the new elastic systems for atomic force microscopy and other recently created advanced structures in precision elasticity.

This book comprehensively reflects the summary of theoretical and experimental studies whose conclusions are effective for optimized structural synthesis in precision elasticity, as well as demonstrates a large experience and options in the synthesis and application of precision elastic guides, mechanisms, correctors, transducers, elastic helicoids, and sensors in instruments and machines including their miniaturization for atomic force microscopy and other advanced solutions. The main focus of this book is in the possible simplification of the corresponding analytical apparatus. This tractable and digestible approach allows for increase of accuracy, sensitivity, responsiveness, and functional ranges in the synthesized precision elastic systems.

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