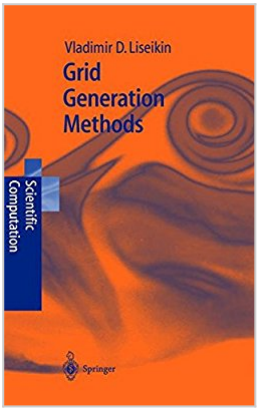

Grid Generation Methods (Scientific Computation)

By Vladimir D. Liseikin

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This book is an introduction to structured and unstructured grid methods in scientific computing, addressing graduate students, scientists as well as practitioners. Basic local and integral grid quality measures are formulated and new approaches to mesh generation are reviewed. In addition to the content of the successful first edition, a more detailed and practice oriented description of monitor metrics in Beltrami and diffusion equations is given for generating adaptive numerical grids. Also, new techniques developed by the author are presented, in particular a technique based on the inverted form of Beltrami's partial differential equations with respect to control metrics. This technique allows the generation of adaptive grids for a wide variety of computational physics problems, including grid clustering to given function values and gradients, grid alignment with given vector fields, and combinations thereof. Applications of geometric methods to the analysis of numerical grid behavior as well as grid generation based on the minimization of functionals of smoothness, conformality, orthogonality, energy, and alignment complete the second edition of this outstanding compendium on grid generation methods.

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- 362 pages

Editorial Review

Review
From the reviews
"This book provides a comprehensive, outstanding theoretical account of many popular grid generation methods, especially for structured grids." (Mathematical Reviews, 2000)

From the Back Cover
This new edition provides a description of current developments relating to grid methods, grid codes, and their applications to actual problems. Grid generation methods are indispensable for the numerical solution of differential equations. Adaptive grid-mapping techniques, in particular, are the main focus and represent a promising tool to deal with systems with singularities. This 3rd edition includes three new chapters on numerical implementations (10), control of grid properties (11), and applications to mechanical, fluid, and plasma related problems (13). Also the other chapters have been updated including new topics, such as curvatures of discrete surfaces (3). Concise descriptions of hybrid mesh generation, drag and sweeping methods, parallel algorithms for mesh generation have been included too.

This new edition addresses a broad range of readers: students, researchers, and practitioners in applied mathematics, mechanics, engineering, physics and other areas of applications.

Users Review

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