A Computational Differential Geometry Approach to Grid Generation (Scientific Computation)

By Vladimir D. Liseikin

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The process of breaking up a physical domain into smaller sub-domains, known as meshing, facilitates the numerical solution of partial differential equations used to simulate physical systems. In an updated and expanded Second Edition, this monograph gives a detailed treatment based on the numerical solution of inverted Beltramian and diffusion equations with respect to monitor metrics for generating both structured and unstructured grids in domains and on surfaces.

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Editorial Review

From the Back Cover

The process of breaking up a physical domain into smaller sub-domains, known as meshing, facilitates the numerical solution of partial differential equations used to simulate physical systems. This monograph gives a detailed treatment of applications of geometric methods to advanced grid technology. It focuses on and describes a comprehensive approach based on the numerical solution of inverted Beltramian and diffusion equations with respect to monitor metrics for generating both structured and unstructured grids in domains and on surfaces. In this second edition the author takes a more detailed and practice-oriented approach towards explaining how to implement the method by:

- Employing geometric and numerical analyses of monitor metrics as the basis for developing efficient tools for controlling grid properties.
- Describing new grid generation codes based on finite differences for generating both structured and unstructured surface and domain grids.
- Providing examples of applications of the codes to the generation of adaptive, field-aligned, and balanced grids, to the solutions of CFD and magnetized plasmas problems.

The book addresses both scientists and practitioners in applied mathematics and numerical solution of field problems.

Users Review

From reader reviews:

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