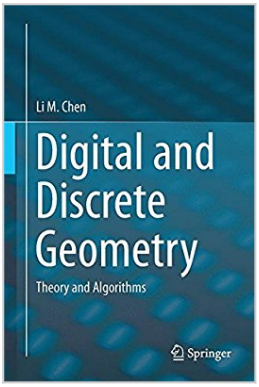

Digital and Discrete Geometry: Theory and Algorithms

By Li M. Chen

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This book provides comprehensive coverage of the modern methods for geometric problems in the computing sciences. It also covers concurrent topics in data sciences including geometric processing, manifold learning, Google search, cloud data, and R-tree for wireless networks and BigData.

The author investigates digital geometry and its related constructive methods in discrete geometry, offering detailed methods and algorithms. The book is divided into five sections: basic geometry; digital curves, surfaces and manifolds; discretely represented objects; geometric computation and processing; and advanced topics. Chapters especially focus on the applications of these methods to other types of geometry, algebraic topology, image processing, computer vision and computer graphics.

Digital and Discrete Geometry: Theory and Algorithms targets researchers and professionals working in digital image processing analysis, medical imaging (such as CT and MRI) and informatics, computer graphics, computer vision, biometrics, and informati
on theory. Advanced-level students in electrical engineering, mathematics, and computer science will also find this book useful as a secondary text book or reference.

Praise for this book:

This book does present a large collection of important concepts, of mathematical, geometrical, or algorithmical nature, that are frequently used in computer graphics and image processing. These concepts range from graphs through manifolds to homology. Of particular value are the sections dealing with discrete versions of classic continuous notions. The reader finds compact definitions and concise explanations that often appeal to intuition, avoiding finer, but then necessarily more complicated, arguments… As a first introduction, or as a reference for professionals working in computer graphics or image processing, this book should be of considerable value." - Prof. Dr. Rolf Klein, University of Bonn.

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Editorial Review

Review

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"This is an informative text covering a surprisingly wide range of topics. The author has succeeded in finding the appropriate (though highly variable) mix of mathematical theory, practical problems, computational approaches, and algorithms. The writing and production quality are generally good ….. The book is suitable for an upper-level undergraduate course and a follow-on graduate course. Researchers and practitioners will find it a reasonably adequate introduction (more details would have been useful in several places, especially for readers not enrolled in a college course). Given the considerable mathematical content in this book, it is more readable than might be expected, especially for readers familiar with principles and problems from related domains, especially computer graphics, image processing, and the theory of algorithms. Since the author explains basic concepts (though often rather briefly) before moving on to more advanced ideas, even readers new to much of the background material should be able to make fair headway.” (R. M. Malyankar, ACM Computing Reviews #CR143755)

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