Mathematical Structures for Computer Graphics

Description:
A comprehensive exploration of the mathematics behind the modeling and rendering of computer graphics scenes.

Mathematical Structures for Computer Graphics presents an accessible and intuitive approach to the mathematical ideas and techniques necessary for two- and three-dimensional computer graphics. Focusing on the significant mathematical ideas, the book establishes key algorithms used to build complex graphics scenes.

Written for readers with various levels of mathematical background, the book develops a solid foundation for graphics techniques and fills in relevant graphics details often overlooked in the literature. Rather than use a rigid theorem/proof approach, the book provides a flexible discussion that moves from vector geometry through transformations, curve modeling, visibility, and lighting models. Mathematical Structures for Computer Graphics also includes:

- Numerous examples of two- and three-dimensional techniques along with numerical calculations
- Plenty of mathematical and programming exercises in each chapter, which are designed particularly for graphics tasks
- Additional details at the end of each chapter covering historical notes, further calculations, and connected concepts for readers who wish to delve deeper
- Unique coverage of topics such as calculations with homogeneous coordinates, computational geometry for polygons, use of barycentric coordinates, various descriptions for curves, and L-system techniques for recursive images

Mathematical Structures for Computer Graphics is an excellent textbook for undergraduate courses in computer science, mathematics, and engineering, as well as an ideal reference for practicing engineers, researchers, and professionals in computer graphics fields. The book is also useful for those readers who wish to understand algorithms for producing their own interesting computer images.

Steven J. Janke, PhD, is Professor of Mathematics and Computer Science at Colorado College. He has over 20 years of teaching experience in the field of computer graphics and is the coauthor of Introduction to Linear Models and Statistical Inference, also published by Wiley.

Contents:
Preface iii
1 Basics 1
   1.1 Graphics Pipeline 2
   1.2 Mathematical Descriptions 5
1.3 Position 6
1.4 Distance 9
1.5 Complements and Details 13
   1.6 Exercises 17
2 Vector Algebra 21
   2.1 Basic Vector Characteristics 22
   2.2 Two Important Products 31
2.3 Complements and Details 42
2.4 Exercises 46
3 Vector Geometry 49
3.1 Lines & Planes 49
3.2 Distances 55
3.3 Angles 63
3.4 Intersections 65
3.5 Additional Key Applications 73
3.6 Homogeneous Coordinates 86
3.7 Complements and Details 90
3.8 Exercises 94
4 Transformations 99
4.1 Types of Transformations 100
4.2 Linear Transformations 101
4.3 Three dimensions 113
4.4 Affine Transformations 123
4.5 Complements and Details 134
4.6 Exercises 145
5 Orientation 149
5.1 Cartesian Coordinate Systems 151
5.2 Cameras 159
5.3 Other Coordinate Systems 182
5.4 Complements and Details 190
5.5 Exercises 193
6 Polygons & Polyhedra 197
6.1 Triangles 197
6.2 Polygons 213
6.3 Polyhedra 230
6.4 Complements and Details 245
6.5 Exercises 250
7 Curves & Surfaces 255
7.1 Curve Descriptions 256
7.2 Bézier Curves 268
7.3 B–Splines 278
7.4 NURBS 295
7.5 Surfaces 300
7.6 Complements and Details 311
7.7 Exercises 316
8 Visibility 321
8.1 Viewing 321
8.2 Perspective Transformation 323
8.3 Hidden Surfaces 333
8.4 Ray Tracing 344
8.5 Complements and Details 351
8.6 Exercises 356
9 Lighting 359
9.1 Color Coordinates 359
9.2 Elementary Lighting Models 364
9.3 Global Illumination 384
9.4 Textures 391
9.5 Complements and Details 403
9.6 Exercises 408
10 Other Paradigms 411
10.1 Pixels 412
10.2 Noise 421
10.3 L–Systems 435
10.4 Exercises 443
A Geometry & Trigonometry 447
A.1 Triangles 447
A.2 Angles 449
A.3 Trigonometric Functions 450
B Linear Algebra 455
B.1 Systems of Linear Equations 455
B.2 Matrix Properties 458

B.3 Vector Spaces 460

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