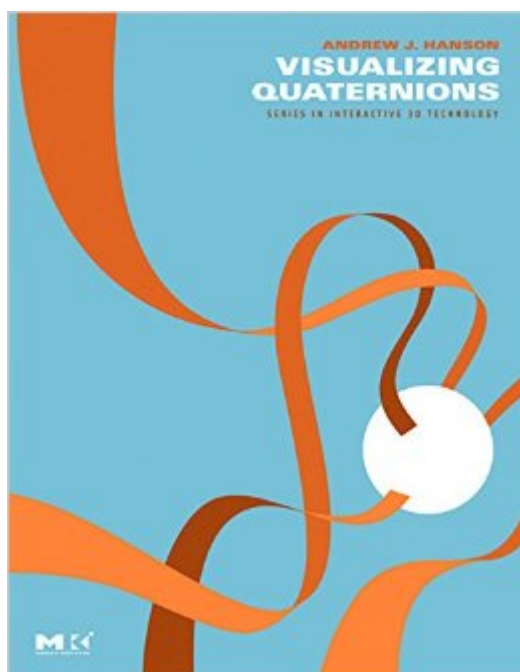# Visualizing Quaternions (The Morgan Kaufmann Series In Interactive 3D Technology)

Synopsis

Introduced 160 years ago as an attempt to generalize complex numbers to higher dimensions, quaternions are now recognized as one of the most important concepts in modern computer graphics. They offer a powerful way to represent rotations and compared to rotation matrices they use less memory, compose faster, and are naturally suited for efficient interpolation of rotations. Despite this, many practitioners have avoided quaternions because of the mathematics used to understand them, hoping that some day a more intuitive description will be available.The wait is over. Andrew Hanson's new book is a fresh perspective on quaternions. The first part of the book focuses on visualizing quaternions to provide the intuition necessary to use them, and includes many illustrative examples to motivate why they are importantâ"a beautiful introduction to those wanting to explore quaternions unencumbered by their mathematical aspects. The second part covers the all-important advanced applications, including quaternion curves, surfaces, and volumes. Finally, for those wanting the full story of the mathematics behind quaternions, there is a gentle introduction to their four-dimensional nature and to Clifford Algebras, the all-encompassing framework for vectors and quaternions.* Richly illustrated introduction for the developer, scientist, engineer, or student in computer graphics, visualization, or entertainment computing.* Covers both non-mathematical and mathematical approaches to quaternions.* Companion website with an assortment of quaternion utilities and sample code, data sets for the book's illustrations, and Mathematica notebooks with essential algebraic utilities.

Book Information

Customer Reviews

This is a very interesting book in the Morgan Kaufmann series, and will appeal to those with a mathematical bent. Visualizing quaternions is broken into three parts. Part 1 treats the elements of quaternions, and parts 2 and 3 treats advanced mathematical topics that place considerably more demands on the reader's mathematical knowledge (and also on the author).Part 1 is an introduction for those readers new to the topic. As far as introductions go, it is not too bad. It does in fact contain one important subject - quaternion interpolation - that is not always covered in other texts. Hanson covers interpolation in part 1 and again in part 2. If your interest is computer animation, this may be sufficient reason to acquire the book...analogous to purchasing an album just to get one song. However, if you are completely new to quaternions and want to develop a firm intuition grounded in first principles, then a book that is at least an order of magnitude better is "Quaternions and Rotation Sequences" by J. B. Kuipers.Parts 2 and 3 are the most interesting parts of the book. Hanson presents a series of small chapters that discuss quaternions from different advanced mathematical viewpoints (differential geometry, group theory, Clifford algebras, octonions). The chapters are small, and so they by necessity contain references to the literature where the considerable background material required for understanding the topics is developed. If you have a good background in differential geometry and some abstract algebra, then the chapters are quite nice. In this sense, parts 2 and 3 of the book are more appropriate for mathematicians.

Download to continue reading...

Visualizing Quaternions (The Morgan Kaufmann Series in Interactive 3D Technology) Visualizing Technology Complete (5th Edition) (Geoghan Visualizing Technology Series) Visual Thinking for Design (Morgan Kaufmann Series in Interactive Technologies) Visualizing The Lifespan (Visualizing Series) Visualizing Psychology (Visualizing Series) MPLS: Technology and Applications (Morgan Kaufmann Series in Networking) Property, A Contemporary Approach, 2d (Interactive Casebook) (Interactive Casebooks) (Interactive Casebook Series) Digital Watermarking (The Morgan Kaufmann Series in Multimedia Information and Systems) Measuring Data Quality for Ongoing Improvement: A Data Quality Assessment Framework (The Morgan Kaufmann Series on Business Intelligence) Computer Architecture, Fifth Edition: A Quantitative Approach (The Morgan Kaufmann

Series in Computer Architecture and Design) Computer Organization and Design, Fourth Edition: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design) Computer Architecture: A Quantitative Approach (The Morgan Kaufmann Series in Computer Architecture and Design) Computer Organization and Design, Third Edition: The Hardware/Software Interface, Third Edition (The Morgan Kaufmann Series in Computer Architecture and Design) Computer Organization and Design: The Hardware Software Interface: ARM Edition (The Morgan Kaufmann Series in Computer Architecture and Design) Computers as Components, Third Edition: Principles of Embedded Computing System Design (The Morgan Kaufmann Series in Computer Architecture and Design) Distributed Algorithms (The Morgan Kaufmann Series in Data Management Systems) See MIPS Run, Second Edition (The Morgan Kaufmann Series in Computer Architecture and Design) Routing, Flow, and Capacity Design in Communication and Computer Networks (The Morgan Kaufmann Series in Networking) Transactional Information Systems: Theory, Algorithms, and the Practice of Concurrency Control and Recovery (The Morgan Kaufmann Series in Data Management Systems) Learning Processing, Second Edition: A Beginner's Guide to Programming Images, Animation, and Interaction (The Morgan Kaufmann Series in Computer Graphics)