



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

Andrew J. Hanson

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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 important—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.

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