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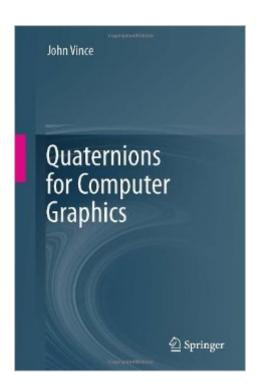
Quaternions For Computer Graphics

Synopsis

Sir William Rowan Hamilton was a genius, and will be remembered for his significant contributions to physics and mathematics. The Hamiltonian, which is used in quantum physics to describe the total energy of a system, would have been a major achievement for anyone, but Hamilton also invented quaternions, which paved the way for modern vector analysis. Quaternions are one of the most documented inventions in the history of mathematics, and this book is about their invention, and how they are used to rotate vectors about an arbitrary axis. Apart from introducing the reader to the features of quaternions and their associated algebra, the book provides valuable historical facts that bring the subject alive. Quaternions for Computer Graphics introduces the reader to quaternion algebra by describing concepts of sets, groups, fields and rings. It also includes chapters on imaginary quantities, complex numbers and the complex plane, which are essential to understanding quaternions. The book contains many illustrations and worked examples, which make it essential reading for students, academics, researchers and professional practitioners.

Book Information

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Customer Reviews

If you know nothing about quaternions, and want to get a feel for how they work and what they can be used for, this book is perfect for you.This book is also perfect e.g. if you are a programmer writing code that has to rotate things in 3D space. I'm not currently doing any coding that requires it, but I am confident that I could code up quaternion rotations without much trouble should the need arise. In fact, that is the purpose of this book more or less, to teach you to be able to do just that.Those that are looking for a mathematically rigorous development of quaternions should look elsewhere. However, even for the more mathematically inclined (like I consider myself to be), since there are no difficult proofs to follow, the book can be read blazingly fast (just a few hours). If you are mathematically knowledgeable but have no real knowledge of quaternions (they aren't covered in any regular courses at my university, for example), this little book (it is quite slim!) can get you familiar, and fast. Some of the stuff covered in the book for the sake of completeness is extremely elementary, so if you are already familiar with these things (e.g. what a field is), I would say go ahead and skim those parts.I give this book 5 stars for being the perfect book to get any mathematically adept person up to speed on the somewhat obscure mathematical entities called "quaternions"; if you are additionally a programmer, the book will also prepare you to write code to rotate arbitrary vectors using quaternions. The book also contains a marvelous discussion of complex numbers and their rotational properties, which naturally sets the stage for quaternions and their own rotational properties.

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