



# Geometric Modeling: The mathematics of shapes

*By Nikolay Golovanov*

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“Geometric modeling continues to grow in importance... Understanding the constructs that underlie geometric modeling will place students and developers at the forefront of these new advancements. Nikolay Golovanov has paved the way to that understanding with this comprehensive presentation.” - Ken Versprille, Ph.D. “Golovanov has created a text that will enable any serious student of geometric design to grasp the full power and beauty of the mathematics behind this essential set of tools, and put them to work. I am deeply impressed by the logical and methodical presentation, and by the clarity of the teaching. Highly recommended!” - Joel N. Orr, Ph.D. This book is intended for those who study, use, or develop geometric modeling systems. It is devoted to the mathematical apparatus of these systems and provides methods for constructing numerical models of the geometry of real and imaginary objects. The book outlines the methods of geometric modeling, including methods for constructing curves, surfaces, and solids. It describes the algorithms and data structures of geometric objects. It also presents principles of interconnection between elements of a model. The book examines some applications of geometric models. This book is based on the author’s experience gained during the development of the C3D geometric kernel. Learn more about C3D at <http://c3dlabs.com/>

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## **Editorial Review**

### About the Author

Nikolay Golovanov is a graduate of the Mechanical Engineering department of Bauman Moscow State Technical University as a designer of space launch vehicles. Upon his graduation, he began to work with the Kolomna Engineering Design Bureau. While at the bureau, Mr. Golovanov developed software for analyzing the strength and stability of shell structures. In 1989 his colleagues Alexander Golikov and Tatiana Yankina left Kolomna Design Bureau to found software developer called ASCON. Although they began with just an “electronic drafting board,” they were already conceiving the idea of three-dimensional parametric modeling. This radical concept eventually changed flat drawings into three-dimensional models. Nikolay Golovanov joined ASCON in 1994 to began development of C3D – the geometric modeling kernel of the company’s CAD KOMPAS-3D. Today he continues to develop algorithms and to improve the C3D kernel – the only commercial 3D kernel from Russia.

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