



Geometry of Curves and Surfaces with MAPLE

By *Vladimir Rovenski*



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This concise text on geometry with computer modeling presents some elementary methods for analytical modeling and visualization of curves and surfaces. The author systematically examines such powerful tools as 2-D and 3-D animation of geometric images, transformations, shadows, and colors, and then further studies more complex problems in differential geometry. Well-illustrated with more than 350 figures---reproducible using Maple programs in the book---the work is devoted to three main areas: curves, surfaces, and polyhedra. Pedagogical benefits can be found in the large number of Maple programs, some of which are analogous to C++ programs, including those for splines and fractals. To avoid tedious typing, readers will be able to download many of the programs from the Birkhauser web site. Aimed at a broad audience of students, instructors of mathematics, computer scientists, and engineers who have knowledge of analytical geometry, i.e., method of coordinates, this text will be an excellent classroom resource or self-study reference. With over 100 stimulating exercises, problems and solutions, {it Geometry of Curves and Surfaces with Maple} will integrate traditional differential and non- Euclidean geometries with more current computer algebra systems in a practical and user-friendly format.

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Editorial Review

Review

"I was hunting for a book that would provide a set of practical exercises for the students of a graduate course entitled 'Geometric Modeling for Computer Graphics'.... The title of [this] book sounds appealing for such a purpose.... Almost every topic you could imagine about curves and surfaces is somewhere inside: this includes common, and less common, definitions and properties (parametric and implicit form, rectangular and polar form, tangent, asymptote, envelope, normal, curvature, torsion, twist, length, center of mass, evolute and involute, pedal and podoid, etc) as well as the whole menagerie of usual, and less usual, curves and surfaces (polynomials and rational polynomials, B-splines, Bezier, Hermite, Catmul--Rom, Beta-splines, scalar and vector fields, polygons and polyhedra, fractals, etc).

Of course 310 pages is a bit short to present all these topics deeply, but for each of them, there is at least a definition, an example, a piece of Maple source code and the resulting figure generated by the code (note that all the code pieces can be downloaded from the author's web page).... The index is rich enough to easily find a topic you are interested in.

To conclude, the book is clearly valuable for at least three kinds of people: first, people who are familiar with the mathematical aspect of curves and surfaces but unfamiliar with the computation and plotting possibilities providing by Maple; second, people who are familiar with Maple but unfamiliar with curves and surfaces; third, people who are unfamiliar with both topics."

? Computer Graphics Forum

"The book can be recommended to students of mathematics, engineering or computer science, who have already a basic knowledge of MAPLE and are interested in the visualizations of geometry." ---**Zentralblatt MATH**

Users Review

From reader reviews:

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