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Shape Interrogation for Computer Aided Design and Manufacturing

Shape interrogation is the process of extraction of information from a geometric model. It is a fundamental component of Computer Aided Design and Manufacturing (CAD/CAM) systems. In this book the authors focus on shape interrogation of geometric models bounded by free-form surfaces. Free-form surfaces, also called sculptured surfaces, are widely used in the bodies of ships, automobiles and aircraft, which have both functionality and attractive shape requirements. Many electronic devices as well as consumer products are designed with aesthetic shapes, which involve free-form surfaces.

This book provides a bridge between the areas geometric modeling and solid modeling. Apart from the differential geometry topics covered, the entire book is based on the unifying concept of recasting all shape interrogation problems to the solution of a nonlinear system.

It provides the mathematical fundamentals as well as algorithms for various shape interrogation methods including nonlinear polynomial solvers, intersection problems, differential geometry of intersection curves, distance functions, curve and surface interrogation, umbilics and lines of curvature, geodesics, and offset curves and surfaces.

The book can serve as a textbook for teaching advanced topics of geometric modeling for graduate students as well as be of interest to professionals in industry.

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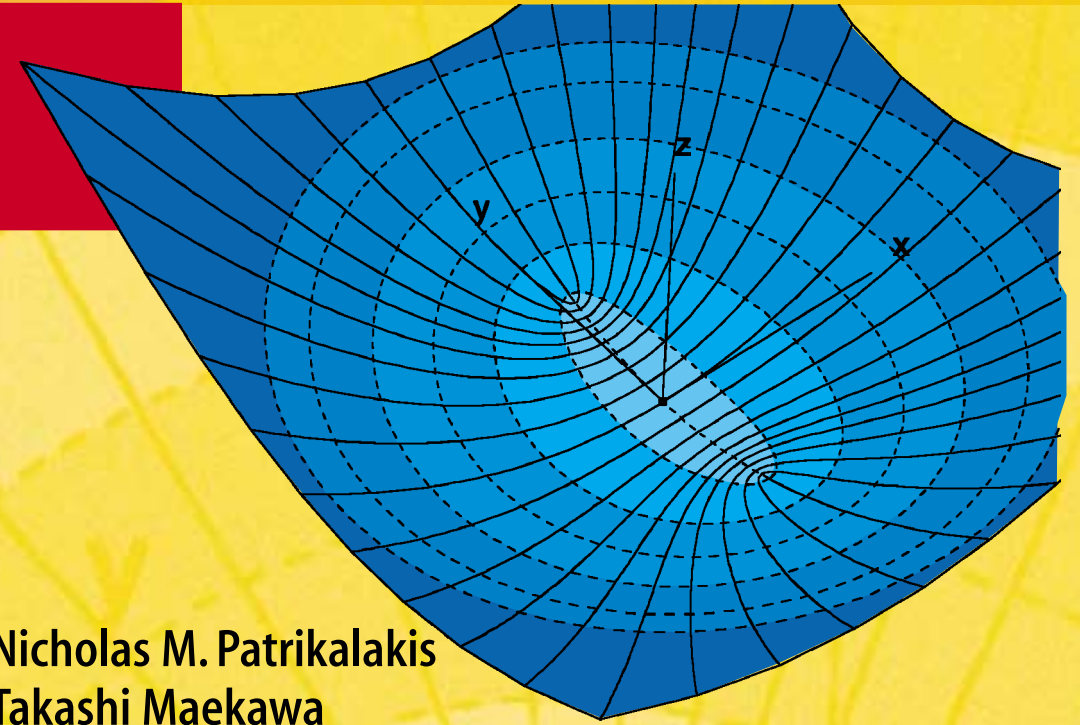
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