6 Guest Editors' Introduction: Computer-Aided Geometry Modeling:
A Key to Effective Use of Computers in Science and Engineering
John N. Shoosmith and Robert E. Fulton

9 A Survey of the Representation and Design of Surfaces
Robert E. Barnhill
Triangular interpolants and distance-weighted interpolants excel as surface methods because of their smooth interpolation of arbitrarily located data.

18 An Operator Calculus for Surface and Volume Modeling
William J. Gordon
The operator calculus modeling technique uses linear operators, operator multiplication, and Boolean addition to produce a distributive lattice of approximation operators.

25 Solid Modeling: Current Status and Research Directions
A. A. G. Requicha and H. B. Voelcker
Since our earlier report, solid modeling has gained a firm foothold in commercial CAD/CAM. Ongoing research promises much more powerful systems with wider applications by the late 1980's.

39 Intersection of Parametric Surfaces by Means of Look-Up Tables
Samir L. Hanna, John F. Abel, and Donald P. Greenberg
A new algorithm offers speed and acceptable accuracy in intersecting parametric surfaces. It is an efficient, convenient algorithm for interactive CAD/CAM applications.

49 An Urnful of Blending Functions
Ronald N. Goldman
Urns models were used back in the 17th century to help develop theories about gambling. Today, these same models offer new insight into computer-aided geometric design.

57 Managing Geometric Information with a Database Management System
R. Peter Dube and Marcia Rivers Smith
Current database management systems do not meet the needs of CAD/CAM users. Boeing's IPAD project strikes at the heart of the problem—moving data across heterogeneous distributed systems.

63 Some Mathematical Tools for a Modeler's Workbench
Elaine Cohen
Although theory provides the concepts and framework for computer-aided geometric modeling, actual practice shows that modeling is often not an immediate application of such theory.