Introduction to Curves and Surfaces

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Course **24** NOTES

Introduction
to
Curves and Surfaces

SIGGRAPH 1995

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Course Organizer

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Abstract

This course presents an introduction to CAGD—Computer-Aided Geometric Design. The mathematical tools required to create well-behaved curves and surfaces are covered, together with efficient algorithms for their implementation. Topics covered include basis functions, Bézier curves, B-splines, and surface patches.

Schedule of Events

Speaker	Topic	Time
Alyn Rockwood	Introduction to CAGD	30 minutes
Hans Hagen	Preliminary Mathematics	45 minutes
Alyn Rockwood	The Bézier Curve	45 minutes
Alyn Rockwood	Blossoming	45 minutes
Hans Hagen	The B-Spline Curve	45 minutes
Alyn Rockwood	Tensor Product Surfaces	30 minutes
Alyn Rockwood, Hans Hagen	Applications and Discussion	30 minutes

There will be a break of approximately 30 minutes at a time to be announced.

Course Contributors

Dr. Alyn P. Rockwood

Alyn P. Rockwood completed B.S. and M.S. degrees in mathematics at Brigham Young University and a Ph.D. at the Dept. of Applied Mathematics and Theoretical Physics of Cambridge University, Cambridge, England. He worked in industrial research for 13 years, including supervisory and research positions at Evans and Sutherland Computer Corp. and Silicon Graphics, Inc. He was involved in flight simulation, CAD/CAM and surface rendering projects at these companies.

Currently, he is on the computer science faculty at Arizona State University. His interests include computer graphics, scientific visualization and computer aided geometric design. He has several patents and many publications in these fields.

Dr. Hans Hagen

Hans Hagen is a professor of computer science at the University of Kaiserslautern, Germany. His research centers on geometric modeling and scientific visualization.

Dr. Hagen received his B.A. and his M.S. from the University of Freiburg and his PhD from the University of Dortmund. Before moving to Kaiserslautern he held faculty positions at the University of Braunschweig and at Arizona State University. He is one of the current directors at the Dagstuhl Conference and Research Center.

Dr. Hagen is on the editorial board of Computer Aided Geometric Design, Transactions on Visualization and Computer Graphics, Computer Aided Design, Computing, and Surveys on Mathematics for Industry.

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Peter Chambers

Peter Chambers received his B.Sc. from the University of Exeter, England, and his M.S. from Arizona State University. Peter is a Staff Engineer in the Advanced Architecture Group at VLSI Technology, Tempe, Arizona. His areas of interest at VLSI include circuit design, bus architectures, and peripheral interfaces for personal computers. His involvement with Arizona State University includes research on texturing methods in computer graphics and interactive learning tools.

The Course Notes

The notes for this SIGGRAPH course are taken largely from a new learning tool for Computer-Aided Geometric Design. This is an electronic book—a dynamic computer-based environment that permits students to study CAGD at their own pace, and provides interactive environments that visually demonstrate the graphical nature of CAGD.

CAGD
Laboratory

Many of the pictures in these notes are "stills" from this learning tool. For further information, please contact Peter Chambers.

One of the features of the ebook is "Popup" definitions of terms that need explanation. These are identified as underlined, bold text. In these course notes, you can find the same definitions collected at the end of each section, listed alphabetically.

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Acknowledgments