SEMINAR

on

SOLID MODELLING

at

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Speakers (in order of appearance)

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PREFACE

These notes contain

1) a topical outline of the material presented orally,

2) a section for each speaker/author containing copies of some of his slides and/or a manuscript prepared for this Seminar, and

3) a final section containing pertinent reprints.

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TOPICAL OUTLINE

Requicha: FUNDAMENTALS I -- REPRESENTATIONS & SYSTEMS

Introduction

History

Models & representations

- -- Examples of representations of solids
- -- Properties of representations
- -- A comparison of representation schemes
- -- Controversial issues

Systems

- -- An example
- -- Survey of contemporary GMS's
- -- The current state of the art

Voelcker: FUNDAMENTALS II -- ALGORITHMS & APPLICATIONS

Survey of demonstrated capabilities

Brief application case studies

- -- Graphics
- -- Mass properties
- -- NC verification
- -- Machining planning
- -- Finite-element meshing

Underlying principles and techniques

- -- Functions and algorithms
- -- The classification function M(X,R)
- -- Analysis of algorithms

Summary

Tilove: REPRESENTATIONS & ALGORITHMS FOR UNSCULPTURED OBJECTS

System characteristics

Representational and computational requirements

-- Core representations
-- Computations to support CSG-like input

Representational alternatives & algorithm design

-- Halfspace & surface representations
-- Curve & segment representations
-- Surface/surface intersection: a case study
-- Curve/halfspace classification: a case study

Summary

Sabin: REPRESENTATIONS & ALGORITHMS FOR SCULPTURED OBJECTS

The evolution of sculptured surface technology

Capabilities of contemporary systems

Representations for sculptured surfaces

Classical algorithms, e.g. for intersection

Subdivision algorithms

The current "gap" between solid-modelling technology and sculptured-surface technology

Future directions

Allen: USER INTERFACES

Introduction

Construction & editing techniques

-- Boolean operations; sweeping
-- Filleting, chamfering, tweaking
-- Wireframes & projections
-- Instantiating generic objects
-- Dependence on internal representations
-- Freedom & responsibility; validity issues

Data entry techniques

-- Absolute data
-- Relational data
-- Storing & manipulating relationships
-- Naming problems

Styles of interaction

-- Naming & pointing
-- Languages & menus

Wesley: NEW CONSTRUCTION TECHNIQUES & APPLICATIONS

Geometric models & engineering databases

Construction of geometric models

-- Direct generation
-- Conversion of existing databases

Database conversion

-- View-to-wireframe conversion
-- Wireframe-to-solid conversion

Applications

-- Design analysis
-- Robotics

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All: QUESTIONS & DISCUSSION