Shape Interrogation I

by

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Outline

- Shape Interrogation
- Motivation
- Problem Formulation
- Algorithms
- Overview of Problems
- Applications
- Future Research Topics
Shape Interrogation

Process of extraction of information from geometric models for use in

- Shape Creation
- Shape Visualization
- Shape Analysis
- Design
- Fabrication/Inspection
Shape Interrogation

The problem can be reduced to solving for zeros (or singular points) of vector fields.

\[
\vec{V} = [V_1, V_2, \ldots, V_n]
\]

\[
V_i = V_i(\vec{u})
\]

\[
\vec{u} = [u_1, u_2, \ldots, u_l] \in S \subset \mathbb{R}^l
\]
Shape Interrogation

“Singularity is almost invariably a clue.”
Sir Arthur Conan Doyle
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Motivation

- Intersections
- Distance Function Computations
- Differential Geometry
- Feature Recognition
- Offsets
Motivation: **Intersections**

- Creation of B-Rep Models
- Visualization (Contouring, Ray Tracing)
- Mesh Generation
- Generation of NC Machining Paths
- Evaluation of Inhomogeneous Models
Motivation: **Intersections**

- Intersection of two bi-quartic Bezier patches
  with four small loops