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

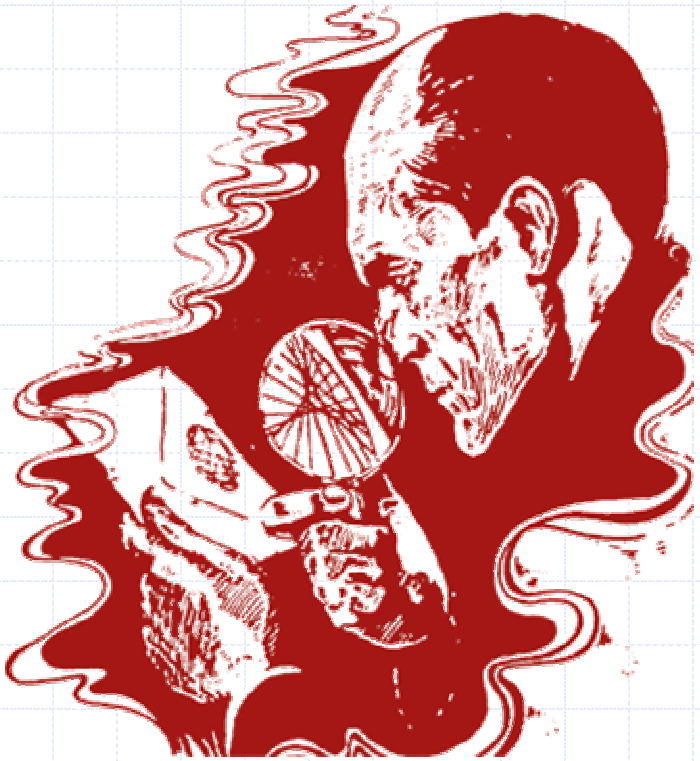
- The problem can be reduced to solving for zeros (*or singular points*) of vector fields.

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

$$V_i = V_i(\vec{u})$$

$$\vec{u} = [u_1, u_2, \cdots, u_l] \in S \subset R^l$$

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