

Tutorial 04 Real-Time Collision Detection for Dynamic Virtual Environments



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Presenters:

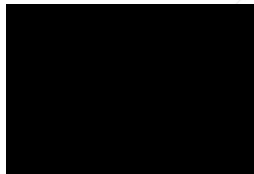
Gabriel Zachmann, Bonn U
Matthias Teschner, Freiburg U
Stefan Kimmerle, Tübingen U
Bruno Heidelberger, ETH Zürich
Laks Raghupathi, INRIA Grenoble
Arnulph Fuhrmann, FhG Darmstadt



Motivation

- CD is enabling technology

Assembly Simulation



IGD / BMW



Virtual Cities



Bonn & Lissabon

Ergonomics Investigation



IGD / BMW



Challenges

- Problem Statement:
 - Arbitrary set of polygons ("polygon soup")
 - No assumption about motion of objects
 - Size: 100,000 polygons / object
- Self-collisions
- Collision information
- Deformation
- Performance
 - Time-critical for real-time, interactive applications

Approaches

- Bounding volume hierarchies
- Distance fields
- Stochastic methods
- Continuous Detection
- Spatial subdivision
- Image-space techniques
- Other representations: Point clouds

Slides Online

- Current version of the slides will be made available at

http://web.cs.uni-bonn.de/~zach/talks/vr05_collidet_tut/

Outline

1. S. Kimmerle: Bounding Volume Hierarchies
2. Ragupathi, Zachmann: Stochastic methods
3. L. Ragupathi: Continuous collision detection
4. A. Fuhrmann: Distance fields
5. Coffee Break
6. M. Teschner: Spatial subdivision
7. B. Heidelberger: Image-space techniques
8. G. Zachmann: Point clouds