2D Polygonal Mesh Draining via Parametric AI Search

by

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University of California, Berkeley

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Abstract

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Professor Sara McMains, Chair

This is the part that explains the paper.

To Ossie Bernosky

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Acknowledgments

To everyone who helped me along this journey.

Chapter 1

Physical Simulation of Water Particles

1.1 Basic Formulation

Parametric Equations (rays)

Geometric Primitive Intersections

1.2 Previous Work

Infinitesimally Slow Rotations

Inelastic Collisions

Kinetic Energy Limitation

1.3 Adaption to Finite Angular Velocities

Parametric Equation Modification

Free Fall Equation

Rolling Equation

Concurrent Rotation & Rolling Equation

Assumption #1 - No concurrent Rotation + Freefall

Elastic Collisions

Planar Collision

Rolling-Edge Collision

Rolling-Corner Collision

Conservation of Momentum

Settling Guarantee

Duration of Simulation

Chapter 2

Solution Search

2.1 General A.I. Search

State Space

State Space Exploration

2.2 Adaption of A.I. Search

Traditional Formulation

Our State Space Formulation

Exploration

2.3 Transition Function

Definition

Sampling

Representative Coverage Between Limits

Graph Search

Cost Sensitive Closed List

2.4 Search

Uniform Cost Search

Cost Function

Time

Energy - Rotation Angle

Energy - Workpiece Center of Gravity