

Motion Planning

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Motion Planning in

1. Discrete Space

Grid with Smoothing
Lattices

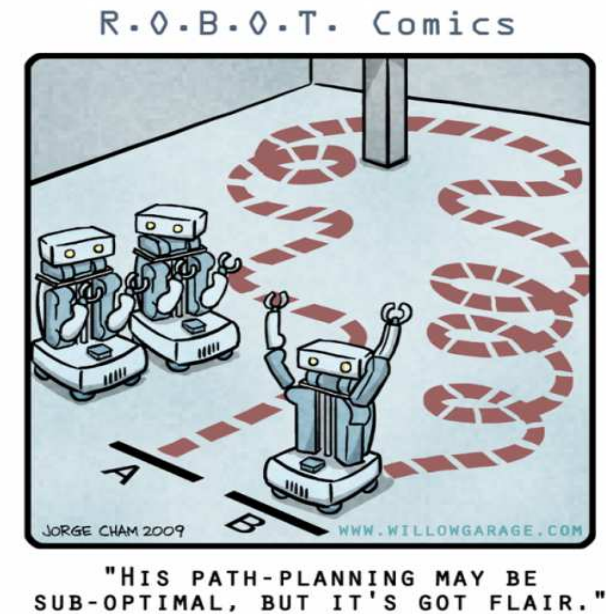
2. Continuous Space

RRTs

RRT*

F-Biasing

F-Biased Shell



Introduction

Discrete Space

■ Discretization

■ Smoothing

■ Lattices

Continuous Space

Biasing

Discrete Space

Discretization

Introduction

Discrete Space

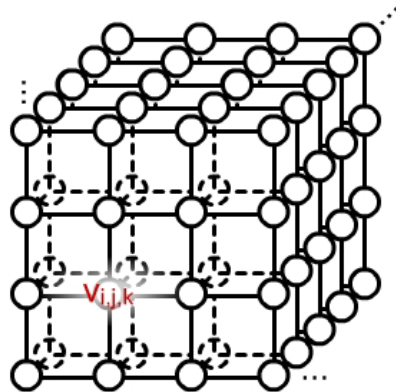
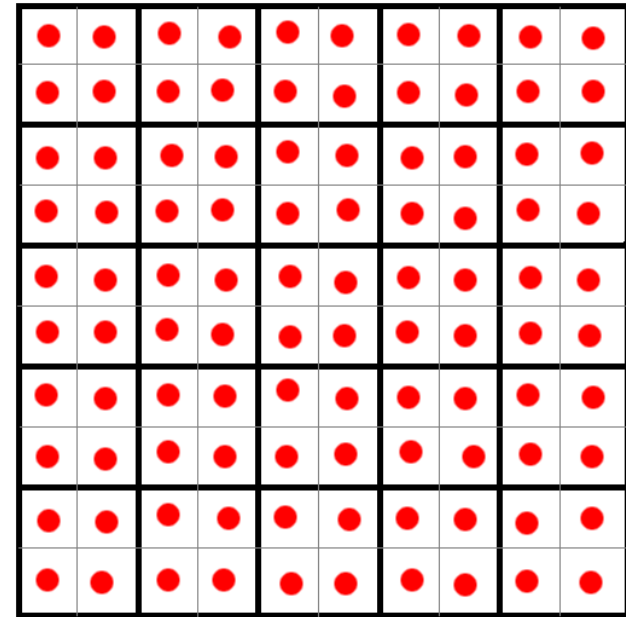
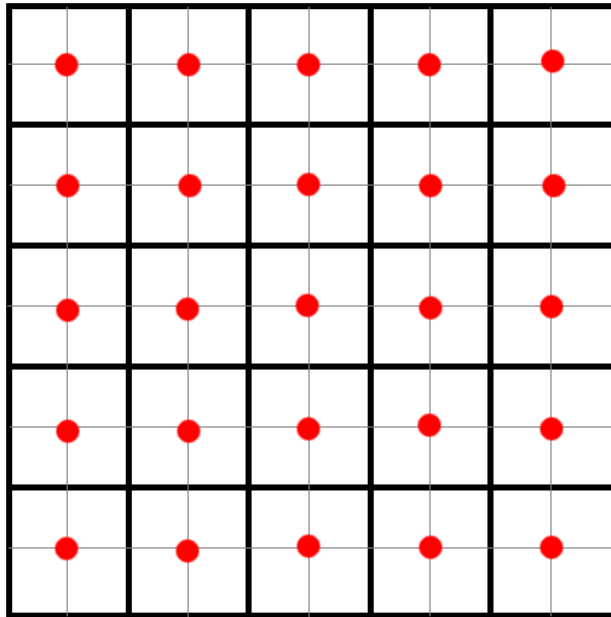
■ Discretization

■ Smoothing

■ Lattices

Continuous Space

Biasing



	Optimal	Complete
Discrete	Yes	Yes
Continuous	No	No

Smoothing

Introduction

Discrete Space

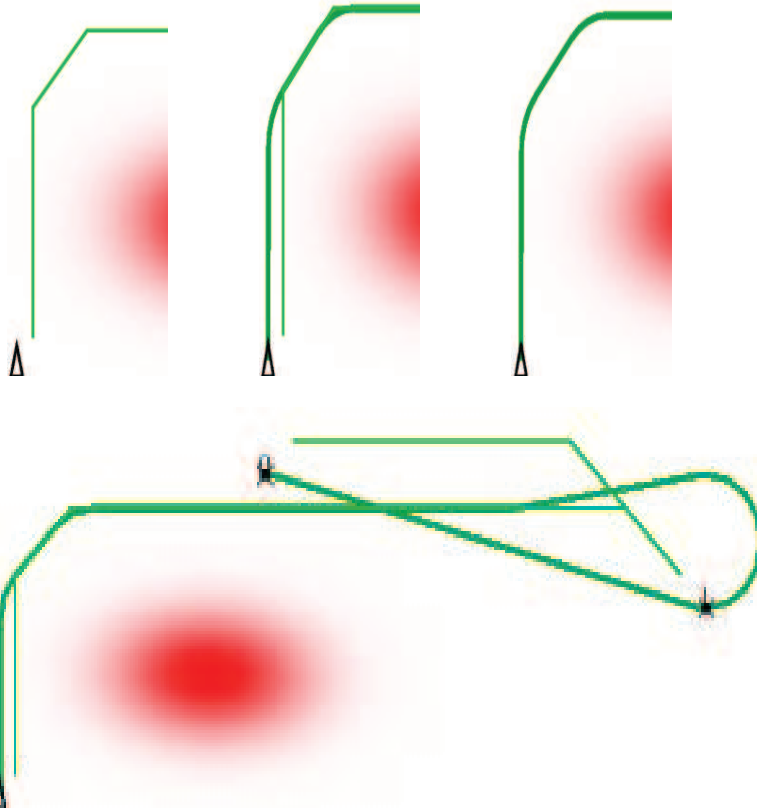
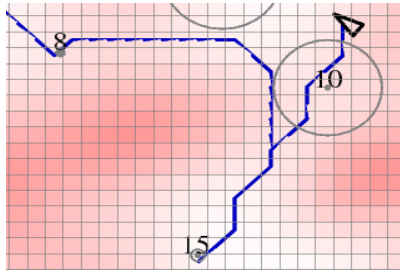
■ Discretization

■ Smoothing

■ Lattices

Continuous Space

Biasing



1. Discretize and apply A^*

2. Apply post processing smoothing

3. Dynamically feasible path

Lattices

Introduction

Discrete Space

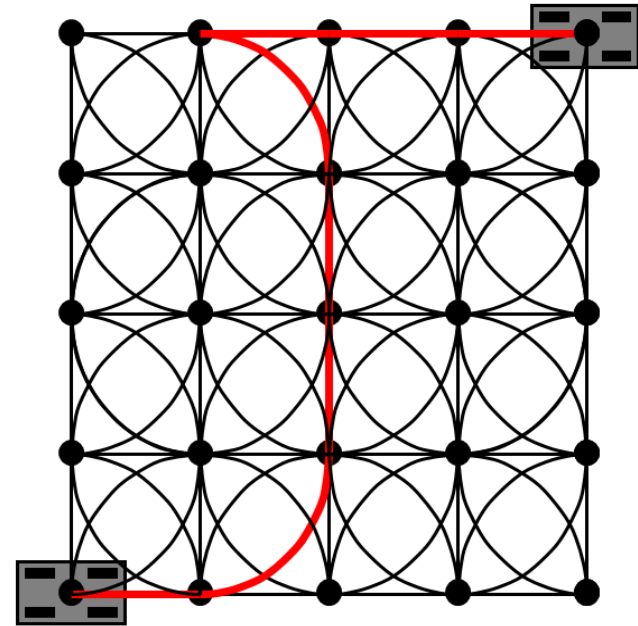
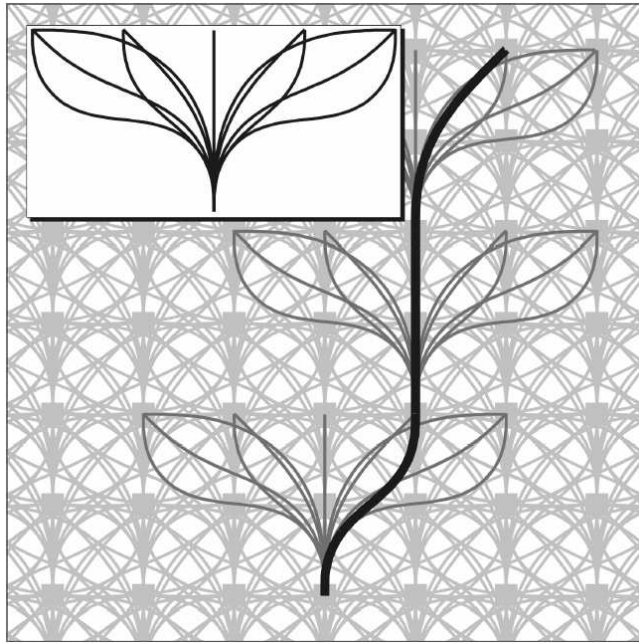
■ Discretization

■ Smoothing

■ Lattices

Continuous Space

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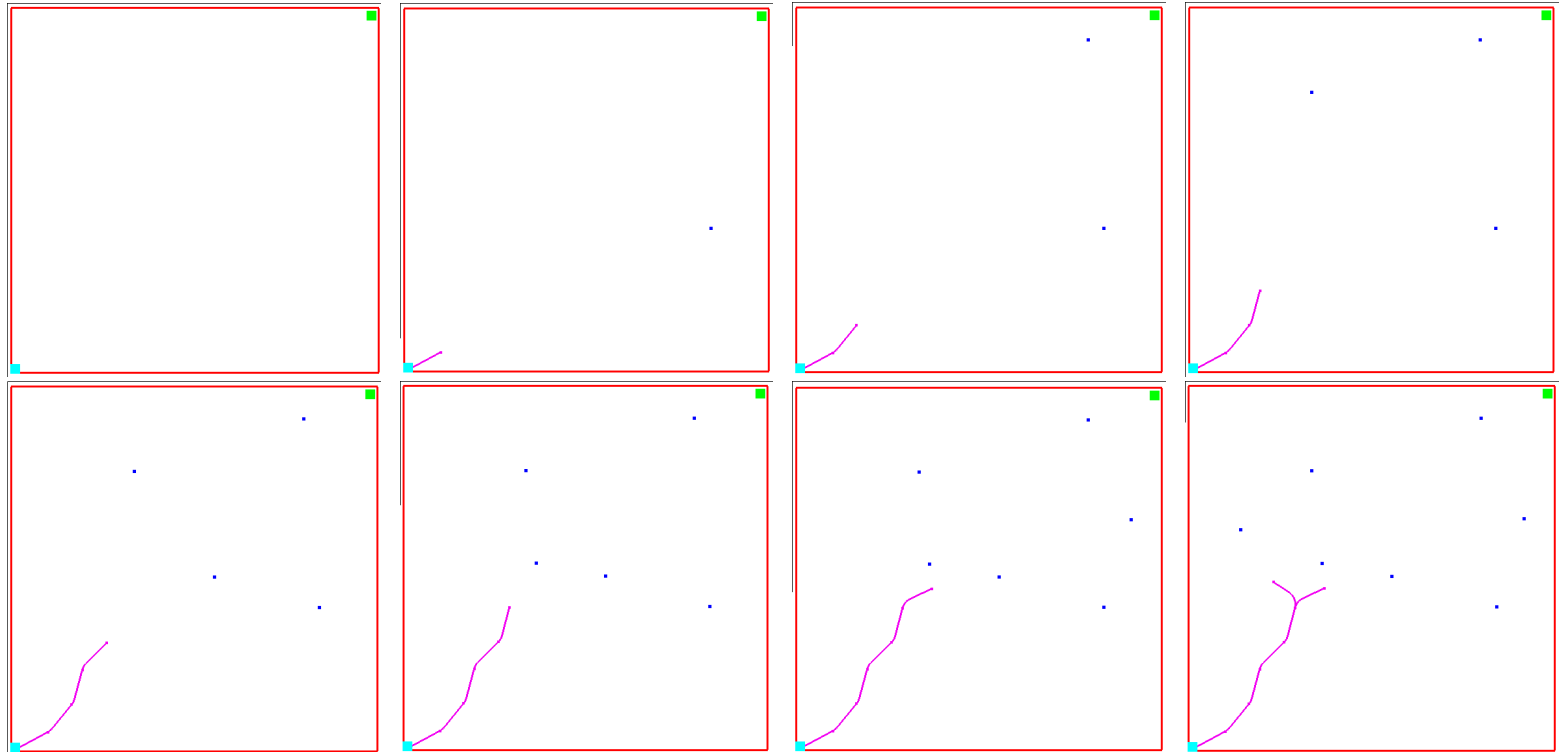
■ RRTs

■ RRT*

Biasing

Continuous Space

Rapidly Exploring Random Trees (RRTs)



	Optimal	Complete
Discrete	–	–
Continuous	No	Yes*

RRT*

Introduction

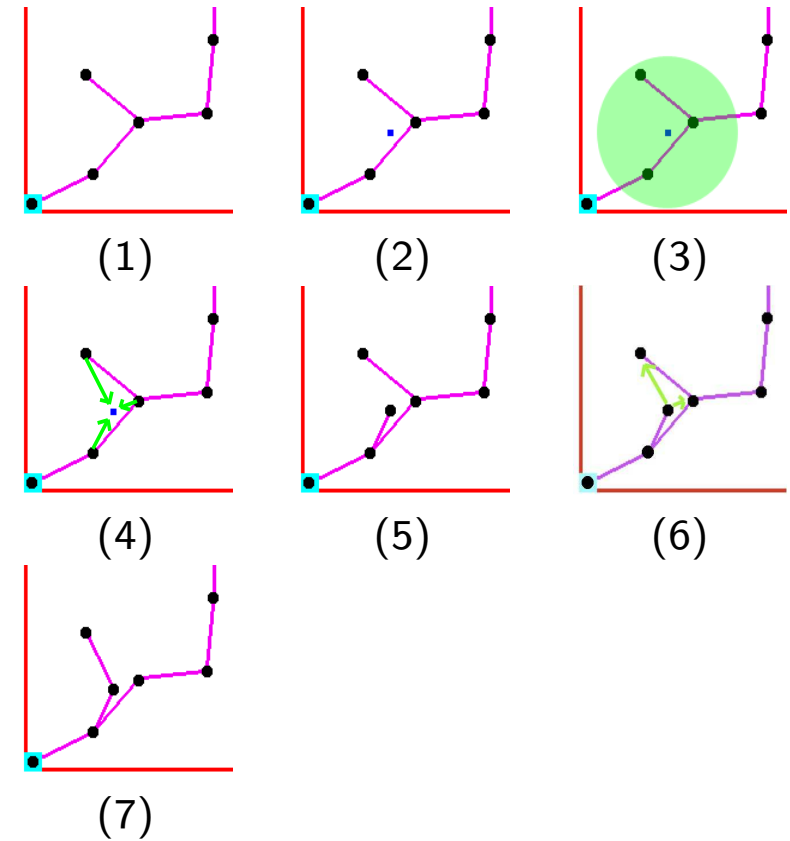
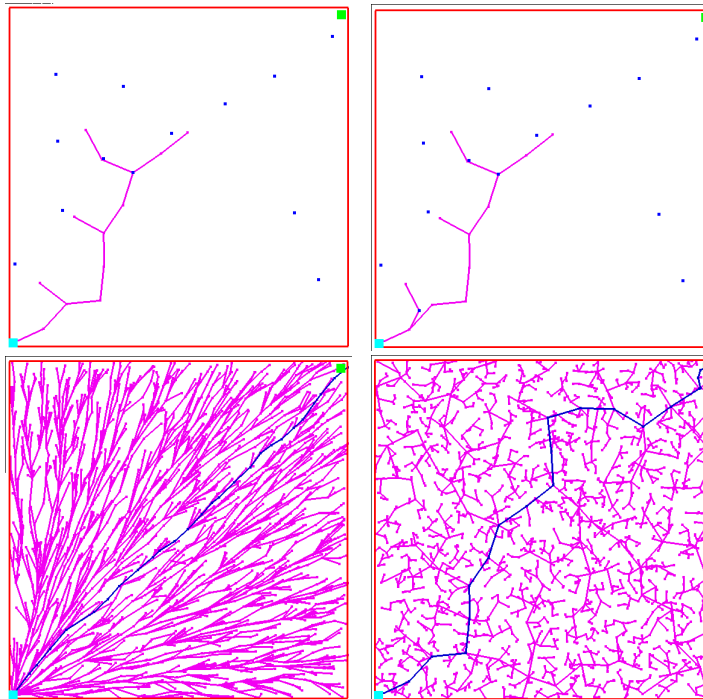
Discrete Space

Continuous Space

■ RRTs

■ RRT*

Biasing



	Optimal	Complete
Discrete	–	–
Continuous	Yes*	Yes*

Introduction

Discrete Space

Continuous Space

Biasing

- Simple Biasing
- F-Biasing
- Shell
- Q&A

Biasing

Unbiased Random Sampling

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Goal Biased Sampling

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F-Biasing

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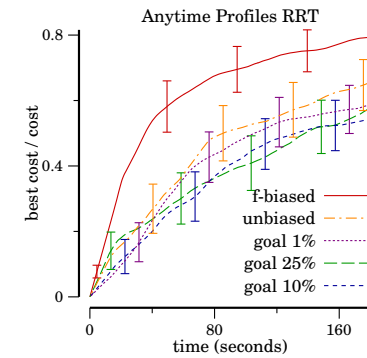
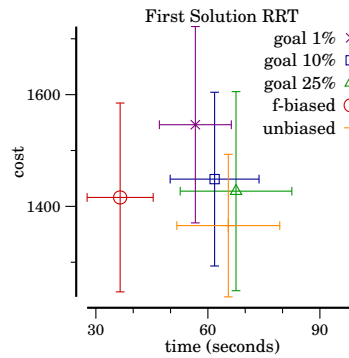
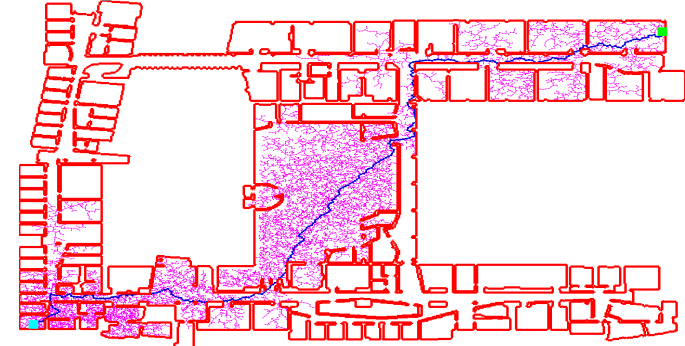
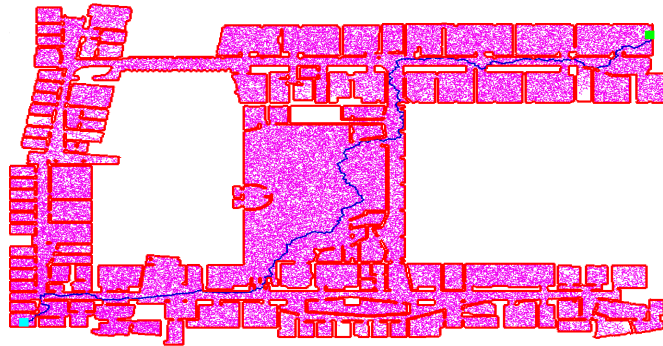
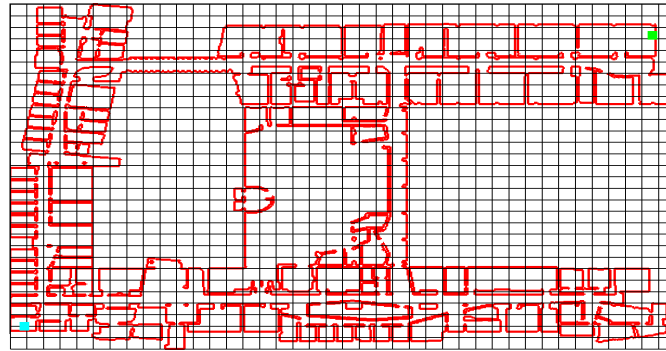
Biasing

■ Simple Biasing

■ F-Biasing

■ Shell

■ Q&A



Shell

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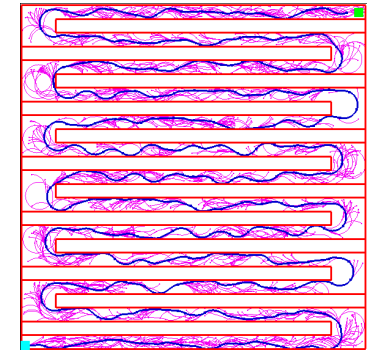
Unbiased



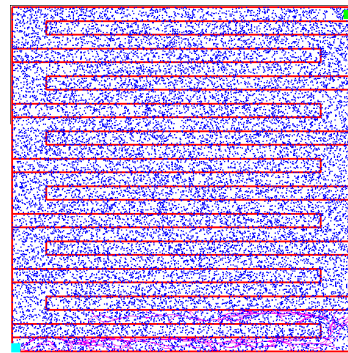
Goal-Biased



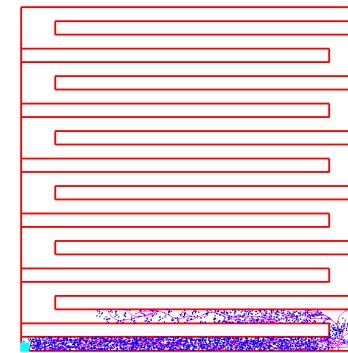
F-Biased



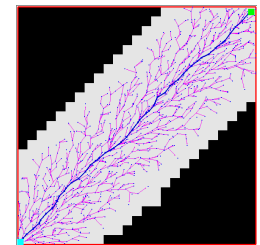
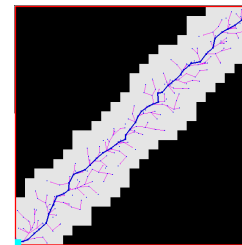
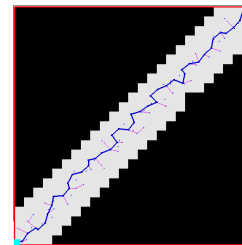
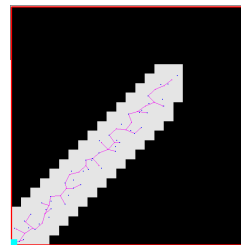
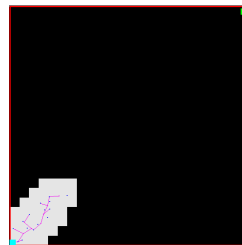
F-Biased Shell



Unbiased 20,000



Shell 2,500



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