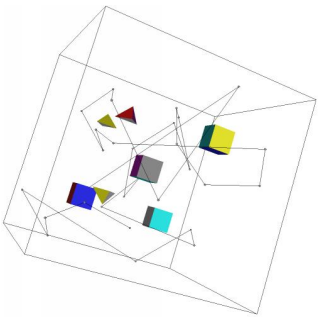
Path Planning
Chairs: Greg Chirikjian, Zvi Shiller

Randomized Planning for Short Inspection Paths

T. Danner and L. Kavraki
Rice University

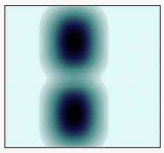
- Path planning for mobile observer robots
- Inspection paths for known environments
- Visibility constraints on range and incidence
- Implementation results in two and three dimensions

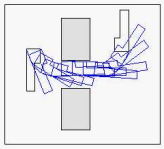


A new potential field method for robot path planning

Yunfeng Wang and Gregory S. Chirikjian
The Johns Hopkins University

- Path planning of non-spherical single body robots.
- Model the artificial potential field using heat transfer with variable thermal conductivity.
- Propose a path optimality method using the concept of heat resistance.
- Reduce a search on RnXSO(n) to one on Rn followed by a search on SO(n).

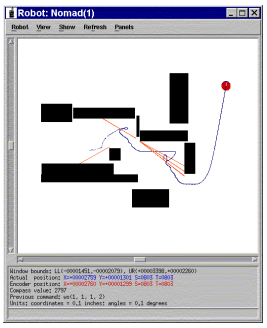




Virtual Obstacle Concept for Local-Minimum Recovery in Potential-Field Based Navigation

Liu Chengqing[1], Marcelo Ang Jr.[1], Hariharan Krishnan[1] and Lim Ser Yong[2]
[1]National University of Singapore and [2]Gintic Institute of Manufacturing Technology

- Local minima problem in reactive motion planning using potential field
- Virtual obstacles created during encounters with concave-shaped obstacles
- Heuristics for getting out of traps
- Simulation results on Nomad 200



Obstacle Traversal for Space Exploration

Zvi Shiller
University of California, Los Angeles

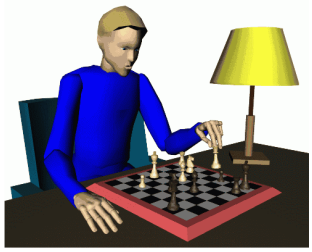
- Traditional obstacle avoidance fails to climb over obstacles when necessary.
- A deterministic traversability measure is introduced that considers safe speeds along the terrain.
- The optimal path is found by a global optimization that considers robot dynamics and terrain topography.
- The optimal traversal path is generally safer than the shortest path.

RRT-Connect: An Efficient Approach to Single-Query Path Planning

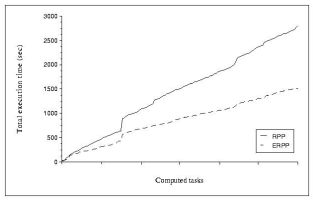
J. J. Kuffner Jr.[1] and S. M. LaValle[2]
[1]Stanford University and [2]Iowa State University

- Practical search of high-dimensional C-spaces
- Randomized approach combining bidirectional RRTs & greedy heuristic
- Experiments include interactive task-level character animation
- Fast, general technique

Human Arm (7 DOF)



ERPP: An Experience-based Randomized Path Planner

S. Caselli and M. Reggiani
Universit di Parma

- multiple planning tasks in the same environment often needed
- heuristic planner & random competition, exploit experience
- remarkable reduction in planning time and variance vs. RPP
- benefits of combining potential field and roadmap