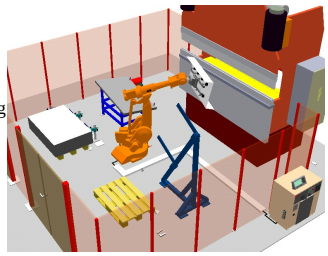
Motion Planning
Organizers & Chairs: Lydia Kavraki, Steven M. LaValle

Current Approaches to Motion Planning
Lydia Kavraki
Rice University

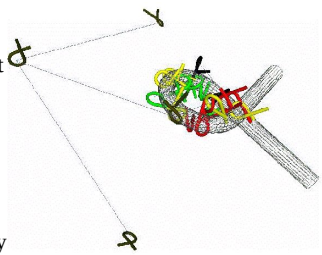
Path Planning Using Lazy PRM
R. Bohlin[1] and L. Kavraki[2]
[1]Chalmers University of Technology and [2]Rice University

- Addresses single query path planning in high-dimensional configuration spaces
- Presents a variation of the Probabilistic Roadmap Method designed to minimize collision-checking and hence running time
- Provides experimental results from an industrial environment
- Concludes that the new planner, called Lazy PRM, is efficient in practice



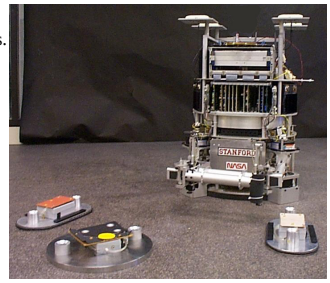
Enhancing Randomized Motion Planners Exploring with Haptic Hints
O. B. Bayazit, G. Song and N. M. Amato
Texas A&M University

- Cooperative motion planning by user and automatic planner.
- User's haptically collected input guides planner's exploration.
- Large improvements achieved by pushing approximate paths to freespace.
- Visual/force feedback extremely useful.



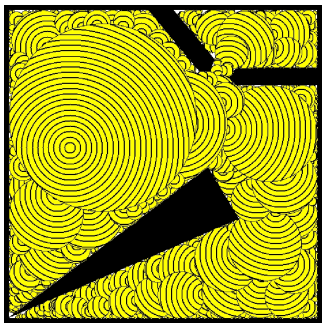
Kinodynamic Motion Planning Amidst Moving Obstacles
R. Kindel, D. Hsu, J. C. Latombe and S. Rock
Stanford University

- Many robots requries fast, kinodynamic motion planning in dynamic workspaces.
- A single-query, random-control based motion planner was developed.
- Hardware experiments and simulations were done for a space robot among moving obstacles.
- The planner efficiently generates kinodynamically constrained paths usable by real robots.



A Framework for Planning Feedback Motion Strategies Based on a Random Neighborhood Graph
L. Yang and S. M. LaValle
Iowa State University

- Build a volumetric approximation to high-DOF free space using a network of randomly-chosen neighborhoods.
- Exploit existing algorithms for efficient distance computation, point location, and neighborhood intersections.
- Ensure representation quality by using probabilistic termination condition.
- Guide the robot using quickly-reconfigurable, global navigation functions that allow feedback.



Real-Time Replanning in High-Dimensional Configuration Spaces Using Sets of Homotopic Paths
Oliver Brock and Oussama Khatib
Stanford University

- Motion execution in dynamic environments must be reactive
- Elastic strips as approach to real-time replanning
- Workspace volume used to represent set of homotopic paths
- Real-time path modification for high-DOF robots in dynamic envorinments