

CSCI-4290/6290: Robot Motion Planning
Lecture 26: December 5, 2003
**Computational Complexity of Path Planning,
and Multiple Robot Coordination**

Announcements

- Please complete and submit any updates to your course project report, documentation, or code by 11:59pm today (December 5).

Today's Class

Today we begin by discussing the computational complexity of motion planning tasks, and then discuss two variants of the multiple robot coordination problem.

1. Computational complexity of motion planning: Several theoretical results have shown that path planning is an inherently difficult problem. These results suggest that the complexity of path planning increases exponentially with the dimension of the configuration space.
2. Trajectory coordination: Coordinating the motions of multiple robots with specified trajectories (paths and velocity profiles) by identifying start times.
3. Velocity coordination: Coordinating the motions of multiple robots with specified paths by generating velocity profiles that satisfy the dynamics constraints.

Reading

Chapter 1.6, Latombe.

References

“Coordinating the Motions of Multiple Robots with Specified Trajectories,” S. Akella and S. Hutchinson, 2002 IEEE International Conference on Robotics and Automation, pp. 624–631, May 2002.

“Coordinating Multiple Robots with Kinodynamic Constraints along Specified Paths,” J. Peng and S. Akella, Fifth International Workshop on Algorithmic Foundations of Robotics (WAFR 2002), December 2002.