CSCI-4965/6963: Robot Motion Planning
Lecture 21: November 12, 2001
Randomized Kinodynamic Planning, and Multiple Robot Coordination

Announcements

- Assignment 5 and your (revised) course project proposal are due today.

Today's Class

1. Randomized Kinodynamic Planning:

   Jufeng Peng will describe two methods for *randomized kinodynamic planning*; one uses RRTs in the state space and the other uses PRMs in the state-time space. Kinodynamic planning involves generating solutions that satisfy both the kinematic and dynamic constraints.

2. We will then continue our discussion of *multiple robot coordination.* We first consider motion planning for a single robot among moving obstacles with known velocities, and then consider motion planning for multiple robots.
   (a) Robot among moving obstacles: Velocity tuning approach
   (b) Centralized planning and the composite configuration space
   (c) Prioritized planning
   (d) Path coordination and the coordination diagram

References

Randomized Kinodynamic Planning. Steven M. LaValle and James J. Kuffner, Jr., *International Journal of Robotics Research,* Vol. 20, No. 5, pages 379–400, May 2001.

Kinodynamic Motion Planning Amidst Moving Obstacles. R. Kindel, D. Hsu, J.C. Latombe, and S. Rock. Proceedings of the *IEEE International Conference on Robotics and Automation*, San Francisco, pages 537-543, April 2000.

Reading

Chapter 8 through 8.2, Latombe.

Next Class

Multiple robot coordination, and manipulation planning.