

CSCI-4290/6290: Robot Motion Planning
Lecture 22: November 15, 2005
**Manipulation Planning,
and Multiple Robot Coordination 3**

Today's Class

Today Todd Gardner will discuss manipulation planning, and then we will continue our discussion of decoupled planning approaches for multiple robot coordination.

1. Manipulation Planning: Todd Gardner will talk about *manipulation planning*, where a robot arm is used to move objects by grasping them. Manipulation planning here is viewed as motion planning for movable objects using sampling techniques.
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 7.3.2, LaValle.

Chapter 11 through 11.4, Latombe. (optional)

References

- “Manipulation Planning with Probabilistic Roadmaps,” T. Simeon, J.-P. Laumond, J. Cortes, and A. Sahbani, *International Journal of Robotics Research*, Vol 23, No.7, pp.729-746, July–August 2004.
- “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, *International Journal of Robotics Research*, Vol. 24, No. 4, pp. 295-310, April 2005.

Next Class

Multiple robot coordination.