

CSCI-4290/6290: Robot Motion Planning
Lecture 21: November 11, 2005
Multiple Robot Coordination 2

Announcements

- Final project proposals are due today.

Today's Class

Today we consider decoupled planning approaches for multiple robot coordination.

1. Path coordination for two robots, and the coordination diagram.
2. Path coordination for multiple car-like robots.
3. Trajectory coordination: Coordinating the motions of multiple robots with specified trajectories (paths and velocity profiles) by identifying start times.
4. Velocity coordination: Coordinating the motions of multiple robots with specified paths by generating velocity profiles that satisfy the dynamics constraints.

Reading

Chapters 7–7.2, LaValle.

Chapter 8.2, Latombe. (optional)

References

“Deadlock-free and collision-free coordination of two robot manipulators,” P. A. O’Donnell and T. Lozano-Perez. In *IEEE International Conference on Robotics and Automation*, pages 484–489, Scottsdale, AZ, May 1989.

“Path Coordination for Multiple Mobile Robots: A Resolution-Complete Algorithm,” Thierry Simeon and Stephane Leroy and Jean-Paul Laumond, *IEEE Transactions on Robotics and Automation*, volume 18, number 1, pages 42–49, Feb 2002.

“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

Manipulation planning.