

CSCI-4290/6290: Robot Motion Planning  
Lecture 25: December 2, 2003  
**Parts Feeding**

## Announcements

- The course project is due by 11:59pm on Wednesday, December 3. See the course web page for additional information and updates on the course project.
- Your project report should be on your project web page. However, submit your project code using the assignment submission procedure.

## Today's Class

Today we consider *parts feeding*, the process by which parts that are to be assembled by a robot are fed in a specified position and orientation. Parts feeding involves parts transfer and parts orienting, and is a form of *motion planning with movable objects*. We consider nonprehensile manipulation, where the object is not grasped and its motions are governed by the task mechanics and geometry.

1. Parts transfer
2. Parts orienting
3. Configuration space representation for manipulation planning

## References

Posing polygonal objects in the plane by pushing, S. Akella and M. T. Mason, *International Journal of Robotics Research*, volume 17, number 1, pages 70-88, January 1998.

Stable Pushing: Mechanics, Controllability, and Planning, K. M. Lynch and M. T. Mason, *International Journal of Robotics Research*, volume 15, number 6, pages 533-556, December 1996.

Parts Feeding on a Conveyor with a One Joint Robot, S. Akella, W. H. Huang, K. M. Lynch, and M. T. Mason. *Algorithmica*, volume 26, number 3/4, pages 313-344, 2000.

Manipulating Parts with an Array of Pins: A Method and a Machine, S. J. Blind, C. C. McCullough, S. Akella, and J. Ponce, *International Journal of Robotics Research*, volume 20, number 10, pages 808-818, Oct 2001.

## Next Class

Complexity of motion planning, and multiple robot coordination.