ME 446 Robot Dynamics and Control

Project Description

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Objectives

• Implement various types of control approaches learned in class to finish given tasks using the robot arm.

• Learn how to select a suitable control approach for a given task.

• Promote active engagement of students to solve challenging engineering problems.
Tasks

Task 1: Peg in a hole
- Force Control

Task 2: Obstacle
- Path planning
- Position Control

Task 3: Zigzag groove
- Path Planning
- Force Control

Task 4: Egg
- Force Control
Task 1: Peg in a hole

- Insert the peg attached to the robot’s end effector in a hole that has tight clearances.

- The peg has to touch the bottom of the hole to get a score. The switch installed at the bottom of the hole will detect a touch.
Task 2: Obstacle

• The robot’s end-effector has to reach the desired goal position without colliding with the obstacle in order to get a score.

• Safe path planning and precise motion control will be required to avoid the obstacle and complete the task.
Task 3: Zigzag Groove

- The peg on the end-effector has to pass through the narrow zigzag groove.

- Path planning and directional force control will be required.

- The dimension of the zigzag will be provided beforehand.
Task 4: Egg Push

• Push the egg without cracking it and touch the edge of the egg holder.

• A spring will be located underneath of the egg. The robot should push the egg with the right amount of force in order to finish the job without breaking the egg.

• The stiffness of the spring will be provided beforehand.
Your group report for this contest is to put together a small webpage explaining how you solved the contest tasks. The web page should have 3 of 4 paragraphs that explain what control techniques your group used to accomplish the tasks along with a video of your controller in action. In addition you should include the names of the group members along with a group picture. Also zip your entire source code project and add a link to this zip file. Finally create links to your 4 lab reports for Lab 1 through Lab 4.