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Robotics Autumn 2020

Review Test Submission: Week 7 - Quiz 3

User	Asher Katz
Subject	Robotics Autumn 2020
Test	Week 7 - Quiz 3
Started	5/05/20 3:13 PM
Submitted	5/05/20 3:43 PM
Status	Completed
Attempt Score	90 out of 110 points
Time Elapsed	29 minutes out of 35 minutes

Question 1

0 out of 10 points

Create a 3-link 3D robot with mdl_3link3d. When q = [pi/6,0,0], where would the robot, called R3, collide with a flat wall at X = 3.1m? (Hint: use LinePlaneIntersection to find the line intersection from the center of the second joint (plot it) to the end effector with the wall plane). The answer is [3.1,y,1]. What is the value of y in meters to 3 decimal places?

Question 2

10 out of 10 points

Create a puma 560 with mdl_puma560.
Assume it s on the floor with q = [90, 30, -80, 0, 50, 0] degrees.
We have a ball whose center is defined by a global transform transl(0.5,0.1,0.6) * trotx(pi/2)
What is the ball's position with respect to the **end-effector's coordinate frame**

Question 3

10 out of 10 points

Which of the following safety measures could be used to reduce the damage a robot could do to a person who needs to work in close proximity with a robot?

Question 4

10 out of 10 points

Which of the following safety measures could be added to physically prevent a human coming in contact with a robot?

Question 5

0 out of 10 points

Create a puma 560 with mdl_puma560.
Assume it's bolted to the floor with q = [0, 45, -80, 0, 45, 0] degrees.
We have an accurate distance sensor, mounted at [1,y,1], which measures the location of the end effector to be exactly 2.2m away from itself. What is the y location of the depth sensor in meters to 3 decimal places

Question 6

10 out of 10 points

Share your screen with the tutor and they will give you the answer via a private chat.
DO NOT GUESS THIS QUESTION

B2

Question 7

10 out of 10 points

Create a puma 560 with mdl_puma560.
When the robot is at q = [pi/6,0,-pi/2,0,0,0], determine where a ray cast from the Z axis (the approach vector) of the end effector intersects with a planar wall (i.e. normal = [-1,0,0] , point= [3.6,0,0]) . Hint: it is recommended that you use LinePlaneIntersection.m

Question 8

10 out of 10 points

Given 2 joint states, q1 = [pi/10, pi/7, pi/5, pi/3, pi/4, pi/6] and q2 = [-pi/10, -pi/7, -pi/5, -pi/3, -pi/4, -pi/6]. Create a 50 step trajectory with a trapezoidal velocity profile.

Using the matrix of joint states, construct a matrix of relative joint velocities and round all values in the joint velocity matrix to **4 decimal places**.

Determine the **maximum absolute** velocity performed by any of the joints and specify your answer to **4 decimal places**.

Question 9

10 out of 10 points

What is one concern with introducing robots such as Sawyer into production lines

Question 10

10 out of 10 points

Create a puma 560 with mdl_puma560. Use the ikine function to determine a joint state such that the end effector position is [0.6,-0.1,0.1]. Use the value from inside the model of qn as the initial guess and **do not** specify the orientation (mask it off)

Question 11

10 out of 10 points

Create a 5DOF planar manipulator where all the DH values of a are 1m. When it has a joint state (in degrees) of (30,-30,35,-30,0), what is the end effector's x position in meters to 3 decimal places

Tuesday, 5 May 2020 3:43:11 PM AEST

← OK