Robotics Autumn 2019

Review Test Submission: Week 3 - Quiz 1

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Subject	Robotics Autumn 2019
Test	Week 3 - Quiz 1
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Attempt Score	20.00000 out of 100.00000 points
Time Elapsed	**31 minutes out of 30 minutes** OVER TIME

Question 1

0.00000 out of 10.00000 points

Your autonomous car is driving on a hexagonal track, where each of the 6 sides of the hexagonal track is 100m long. The car drives 100m straight then turns left by 60 degrees (assume zero turn radius). If it starts at [100,173.2] with a heading of 180 degrees (i.e. se3(se2(100,173.2,pi))). Where will it be after it has completed 3 iterations of [drive 100m straight then turn 60 degs left]?

Question 2

0.00000 out of 10.00000 points

Create a puma560 arm with mdl_puma560, then use the teach method (i.e. p560.teach) to move the arm so all the joints are at 25 degrees. How far **in radians** is the closest joint limit?

Question 3

0.00000 out of 10.00000 points

You take your autonomous Quadcopter flying on a flat airstrip. Assuming the Aircraft principal axes from wiki (note the direction of the Z axis). It starts at the standard origin. Relative to its local frame it flies with the following translational vectors: [0,0,-8] then [8,8,10] then [-5,3,-1]. What is its xyz position in the global frame?

Question 4

0.00000 out of 10.00000 points

In order to first rotate around the Y axis by 180 degrees, then translate along the Z axis by 1.5m and the X axis by 0.8 , what does the 4x4 Homogenous matrix look like

Question 5

10.00000 out of 10.00000 points

Create a puma560 arm with mdl_puma560, then use the teach method (i.e. p560.teach) to move the arm so all the joints are at 20 degrees. What is the [X,Y,Z,R,P,Y] value in meters and degrees?

Question 6

10.00000 out of 10.00000 points

Which of the following is **untrue** about the Euler angles

Question 7

0.00000 out of 10.00000 points

In order to translate along the Y axis by 1.5m and the Z axis by 0.8, , then rotate around the Z axis by 180 degrees, what does the 4x4 Homogenous matrix look like

Question 8

0.00000 out of 10.00000 points

What does the matrix of a rotation around the X axis by 90 degrees look like?

Question 9

0.00000 out of 10.00000 points

You take your autonomous Quadcopter flying on a flat airstrip. Assuming the Aircraft principal axes from wiki (note the direction of the Z axis). It starts at the standard origin. Relative to its local frame it flies with the following translational vectors: [0,0,-8] then [8,8,0] then [-5,3,2]. What is its xyz position in the global frame?

Question 10

0.00000 out of 10.00000 points

In order to translate along the Y axis by 1.5m and the Z axis by 0.8 what does the 4x4 Homogenous matrix look like

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