NPTEL » Introduction to Robotics

Course outline How does an NPTEL online course work? Week 0 Week 1 Week 2 Week 3 Week 4 Week 5 Lecture 09 - Inverse Kinematics of PUMA Robot Lecture 10 - Jacobian and Singularity Week 5 - Lecture Notes Quiz : Assignment 5 Feedback for Week 5 Assignment 5 Solution Week 6 Week 7 Week 8 Week 9

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About the Course Ask a Question Progress Announcements Mentor **Assignment 5** The due date for submitting this assignment has passed. Due on 2021-02-24, 23:59 IST. As per our records you have not submitted this assignment. 1) In order to solve the inverse kinematics of the PUMA robot, the order of multiplying the transformation matrices are 1 point $^{1}T_{3}$ $^{1}T_{4}$ $^{1}T_{6}$ $^{1}T_{5}$ No, the answer is incorrect. Score: 0 Accepted Answers: $^{1}T_{6}$ 2) In the case of the PUMA robot when we multiply transformation 1T_6 the (2,4) term is a 1 point S_4 01 0 constant (d₃) No, the answer is incorrect. Score: 0 Accepted Answers: constant (d_3) 3) For the 2 DOF planer arm shown below, the first row of the Jacobian is (length of the links= 1 unit) 1 point $-c_1-s_{12},-s_{12}$ $-s_1-s_{12},-s_{12}$ $-s_1-c_{12},-s_{12}$ $-c_1-c_{12},-c_{12}$ No, the answer is incorrect. Score: 0 Accepted Answers: $-s_1-s_{12},-s_{12}$ 4) The jacobian matrix relates the 1 point end effector velocity and joint velocity ond effector velocity and joint torque joint torque and joint angle joint angle and joint acceleration No, the answer is incorrect. Score: 0 Accepted Answers: end effector velocity and joint velocity 5) At a singular point the determinant of the Jacobian matrix is 1 point infinity 0 1 0 -1 No, the answer is incorrect. Score: 0 Accepted Answers: 0 At a singular point the joint velocity is infinity 0 oculd be anything unity No, the answer is incorrect.

1 point Score: 0 Accepted Answers: infinity In order to minimize the energy consumed, the determinant of the Jacobian matrix should be 1 point 0.5 minimised 0 maximized No, the answer is incorrect. Score: 0 Accepted Answers: maximized 8) For a two link (2R) 2DOF planer arm, the singular positions for angle θ_2 are equal to 1 point $0^{o}, 90^{o}$ $90^{\circ}, 180^{\circ}$ $0^{o}, 180^{o}$

 $90^{\circ}, 90^{\circ}$ No, the answer is incorrect. Score: 0 Accepted Answers: $0^{\circ}, 180^{\circ}$ Manipulation ability is the ability to 1 point lift up objects from ground move easily in a particular direction quickly complete a task change the workspace when required No, the answer is incorrect. Score: 0 Accepted Answers: move easily in a particular direction 10) The singular value decomposition(SVD) of the jacobian matrix gives us a diagonal matrix whose values determine the 1 point maximum and minimum joint angles major and minor axis of the velocity ellipsoid

maximum and minimum joint torques

major and minor axis of the velocity ellipsoid

none of the above

Accepted Answers:

Score: 0

No, the answer is incorrect.