Industrial Robotics Assignment 1. Exercise 1 Explain what a Rotation Matrix is, how it is derived and what are its uses in robotics. Explain and give example on the difference between performing the compounding of Rotation Matrices with respect to the current frame or respect to the fixed frame. Finally, explain how we can describe the rate of change in time of a Rotation Matrix and how this is connected to the definition of the Angle and Axis representation. Use equations, schematics and examples. (maximum 500 words) Exercise 2 Consider the RRR planar manipulator in Fig. 1, where L1 = 0.3, L2 = 0.2 and L3 = 0.1 and where angles θ1, θ2, θ3 respectively belong to joint-1, joint-2 and joint-3. Noticing carefully the orientation of the end-effector: 1. derive and explain each passage to compute the forward kinematic of this kind of manipulator using pure geometrical reasoning (i.e only using Homogenous Transformation Matrices), 2. derive and explain each passage to compute the forward kinematic of this kind of manipulator using Screw Theory, 3. following the solution with Screw Theory, then write a Matlab code that solves the Forward Kinematic and draws the workspace when θ1 = 40◦ , θ2 = 20◦ and −90◦ ≤ θ3 ≤ 90◦ , 4. finally solve the Forward Kinematic to draw the full workspace when the joint angles are allowed to span every possible angle, i.e. 0◦ ≤ θ1, θ2, θ3 ≤ 360◦