National Chiao Tung University

Department Electrical Engineering

Robotics Project: Part 1

Due: 11/18/20 Fall 2020

For a PUMA 560 robot manipulator with the following kinematic table,

Joint	d(m)	a(m)	α	θ
1	0	0	-90°	0°
2	0	0.432	0°	0°
3	0.149	-0.02	90°	0°
4	0.433	0	-90°	0°
5	0	0	90°	0°
6	0	0	0°	0°

$$-160^\circ \leq \theta_1 \leq 160^\circ,\ -125^\circ \leq \theta_2 \leq 125^\circ$$
$$-135^\circ \leq \theta_3 \leq 135^\circ,\ -140^\circ \leq \theta_4 \leq 140^\circ$$
$$-100^\circ \leq \theta_5 \leq 100^\circ,\ -260^\circ \leq \theta_6 \leq 260^\circ$$

please write a program for the following two transformations:

- input: Cartesian point (n, o, a, p), output: the corresponding joint variables.
- input: joint variables, output: Cartesian point (n, o, a, p) and (x, y, z, ϕ, θ, ψ).