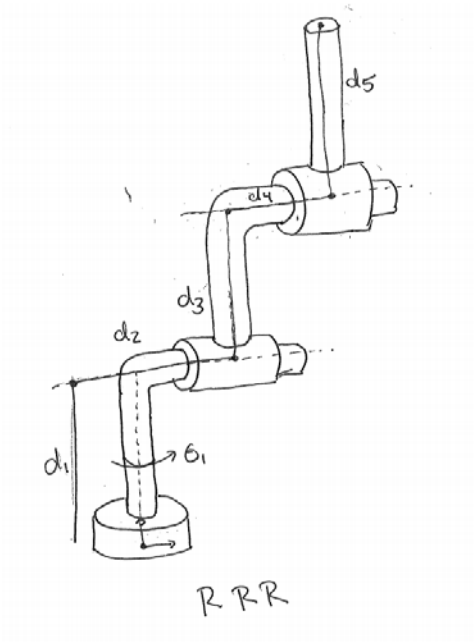
ECE 761 - Homework #4

Reference Frames and Zero Position

1a) Define the reference frames for an RRR robot

1b) Modify the program RRR.m to draw this robot with

d1	d2	d3	d4	d5
50cm	20cm	50cm	20cm	50cm



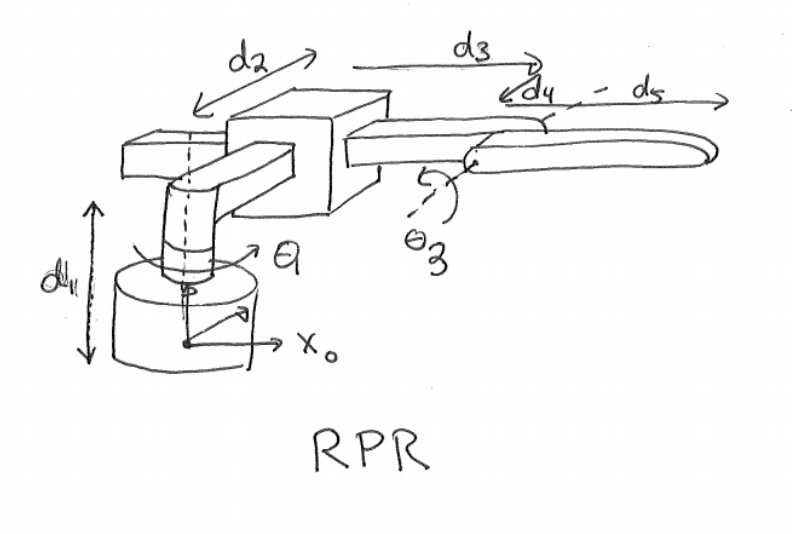
1c) Draw this robot in zero position (screen dump from Matlab)

Link i	α_{i-1} The angle between the Zi-1 and Zi axis (twist)	a_{i-1} The distance from Zi-1 to Zi measured along the Xi-1 axis	d_i The distance from Xi-1 to Xi measured along the Zi axis	θ_i The angle between Xi-1 and Xi measured about the Zi axis
1				
2				
3				

2a) Define the reference frames for an RPR robot

2b) Modify the program RPR.m to draw this robot with

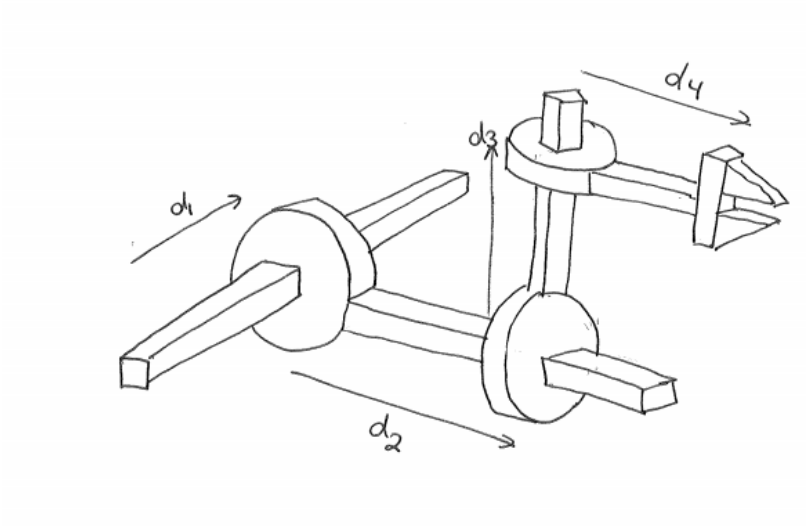
d1	d2	d3	d4	d5
50cm	20cm	0 - 100cm	5cm	50cm



2c) Draw this robot in zero position (screen dump from Matlab)

Link i	α_{i-1} The angle between the Zi-1 and Zi axis (twist)	a_{i-1} The distance from Zi-1 to Zi measured along the Xi-1 axis	d_i The distance from Xi-1 to Xi measured along the Zi axis	θ_i The angle between Xi-1 and Xi measured about the Zi axis
1				
2				
3				

3a) Define the reference frames for an PPP robot



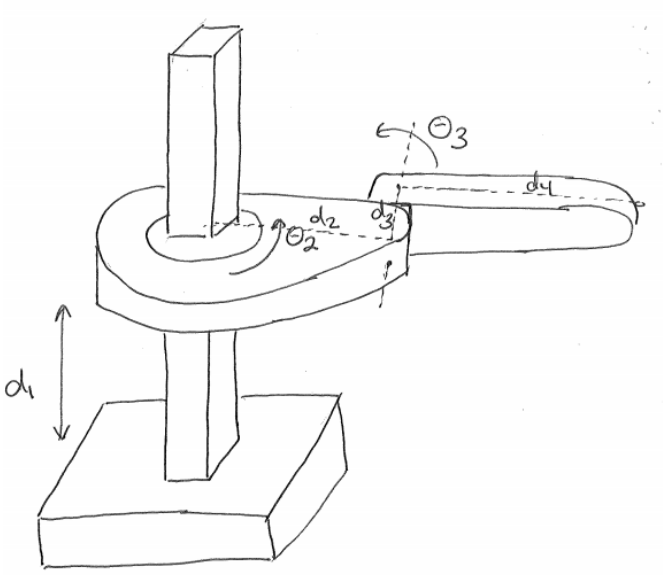
3b) Write a program, PPP.m (modify RRR.m), to draw this robot with

d1	d2	d3	d4
0 - 100cm	0 - 100cm	0 - 100cm	20cm

3c) Draw this robot in zero position (screen dump from Matlab)

Link i	α_{i-1} The angle between the Zi-1 and Zi axis (twist)	a_{i-1} The distance from Zi-1 to Zi measured along the Xi-1 axis	d_i The distance from Xi-1 to Xi measured along the Zi axis	θ_i The angle between Xi-1 and Xi measured about the Zi axis
1				
2				
3				

4a) Define the reference frames for an PRR robot



4b) Modify the program RRR.m to draw this robot with

d1	d2	d3	d4
0 - 100cm	50cm	5cm	50cm

4c) Draw this robot in zero position (screen dump from Matlab)

Link i	α_{i-1} The angle between the Zi-1 and Zi axis (twist)	a_{i-1} The distance from Zi-1 to Zi measured along the Xi-1 axis	d_i The distance from Xi-1 to Xi measured along the Zi axis	θ_i The angle between Xi-1 and Xi measured about the Zi axis
1				
2				
3				