

Robotics II

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Table 1 contains the Denavit-Hartenberg parameters of a robot with four revolute joints.

i	α_i	a_i	d_i	θ_i
1	$\frac{\pi}{2}$	0	0	θ_1
2	$\frac{\pi}{2}$	0	0	θ_2
3	$-\frac{\pi}{2}$	0	d_3	θ_3
4	0	a_4	0	θ_4

Table 1: Denavit-Hartenberg parameters of a 4R robot

1. Use the recursive algorithm based on moving frames to determine the kinetic energy of the robot. Make reasonable assumptions in order to simplify the inertial properties of the links (e.g., each link has a uniformly distributed mass, etc.)
2. Determine the robot inertia matrix. Find a minimal linear parameterization for this matrix.

[120 minutes; open books]