



RoboAnalyser 2021

ROC CONDUCTED BY DR. NAYAN M. KAKOTY OF TEZPUR UNIVERSITY IN COLLABORATION WITH S K SAHA, IIT DELHI AND RAJEEVLOCHAN C. G. OF AMRITA UNIVERSITY, BENGALURU, DURING MAY 1,2021 TO JULY 11,2021.

Team B3 members:

- ▶ DHANAVATH PRAVEEN NAIK (Coordinator).

- ▶ “No matter how many people are working, just show how you are working..”

Denavit and Hartenberg (DH) parameters

- ▶ A robot manipulator consists of several links connected by, usually, single degree of freedom joints, say, a revolute or a prismatic joint. In order to control the end-effector w.r.t base, it is necessary to find the relation between the co-ordinate frames attached to the end-effector and the base.

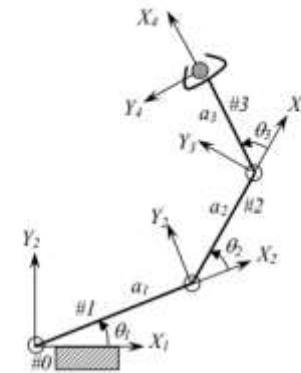
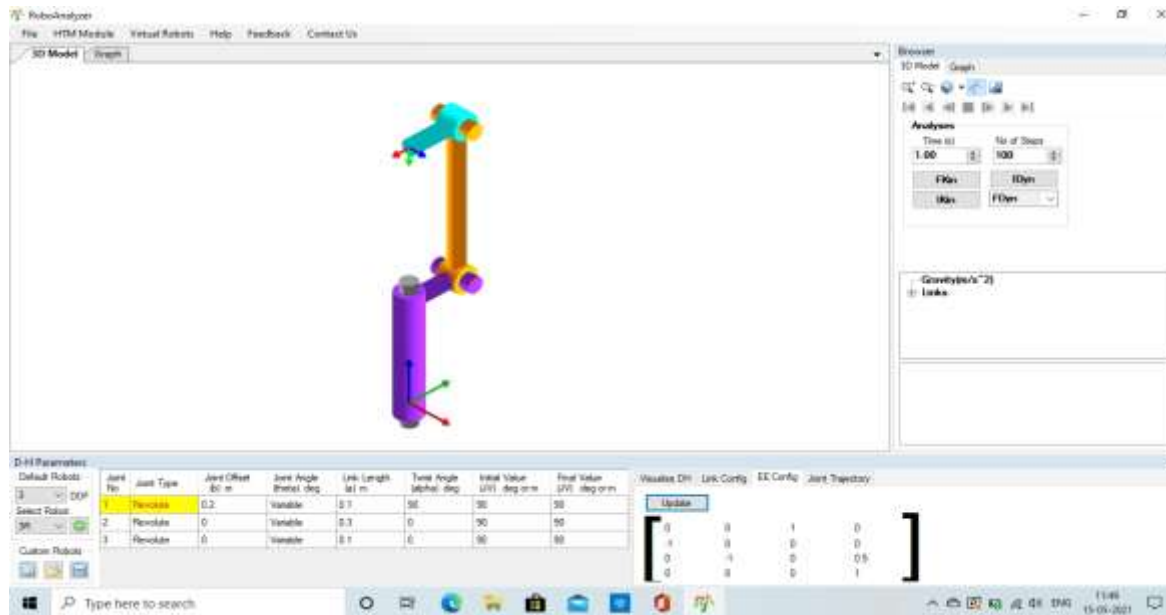


Figure 5.24 A three-link planar arm

Table 5.2 DH parameters of the three-link arm

Link	b_i	θ_i	a_i	α_i
1	0	θ_1 (JV)	a_1	0
2	0	θ_2 (JV)	a_2	0
3	0	θ_3 (JV)	a_3	0

JV: Joint Variable

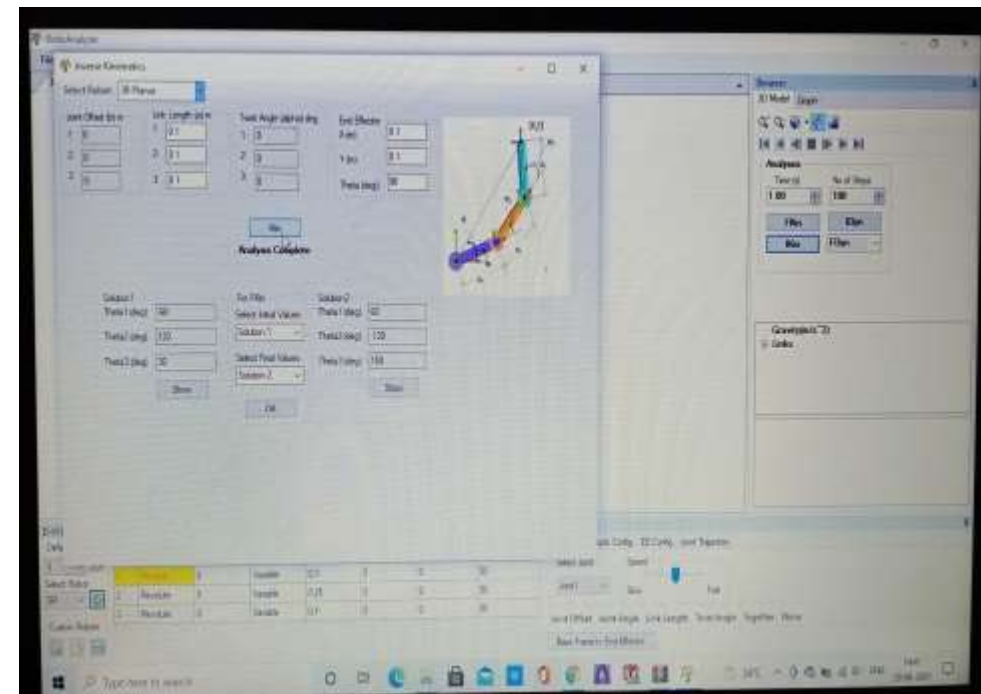
Robot kinematics: forward and inverse

Forward kinematics

- ▶ Motion of links in without considering the forces.
- ▶ Joint to Cartesian space, end-effector configuration in base frame



Inverse kinematics



- Joint jogging is the movement shown in vrm through the joints in theta.
- Cartesian control is the movement shown in vrm through the Cartesian coordinates of end of joints.

Joint Control Cartesian Control Record

Record

Start Stop

Clear Export

Playback

Play Stop

Browse File Reset

End-effector Frame

X: 800 A: 180

Y: 0 B: 0

Z: 1005 C: 0

Homogeneous Transformation

1	0	0	800
0	-1	0	0
0	0	-1	1005
0	0	0	1

Final submission of name in vrm

Virtual Robot Simulator Developed at IIT Delhi | Robot Name: ABB IRB 120 | Payload: 3 kg | Total Weight: 25 kg

Select: ABBIRB120

Record

Start Stop

Clear Export

Playback

Play Stop

Browse File Reset

End-effector Frame

X: 153.037 A: 180

Y: -66.809 B: 0

Z: 390.612 C: 0

Homogeneous Transformation

1	0	0	153.037
0	-1	0	-66.809
0	0	-1	390.612
0	0	0	1

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