RoboAnalyzer Based Online Competition (ROC)2022

We certify that this project was undertaken by us for the RoboAnalyzer based Online Competition (ROC) as a virtual summer internship conducted by Dr. Nayan M. Kakoty of Tezpur University in collaboration with Prof. Subir. K. Saha of Indian Institute of Technology, Delhi, Mr. Rajeevlochan C.G. of Amrita Vishwa Vidyapeetham, Bengaluru, and Embedded Systems and Robotics Lab, Tezpur University from June 2022 to July 2022.

TEAM MEMBERS (GROUP NO.1):

1. SUMAN DAS (TEZPUR UNIVERSITY)
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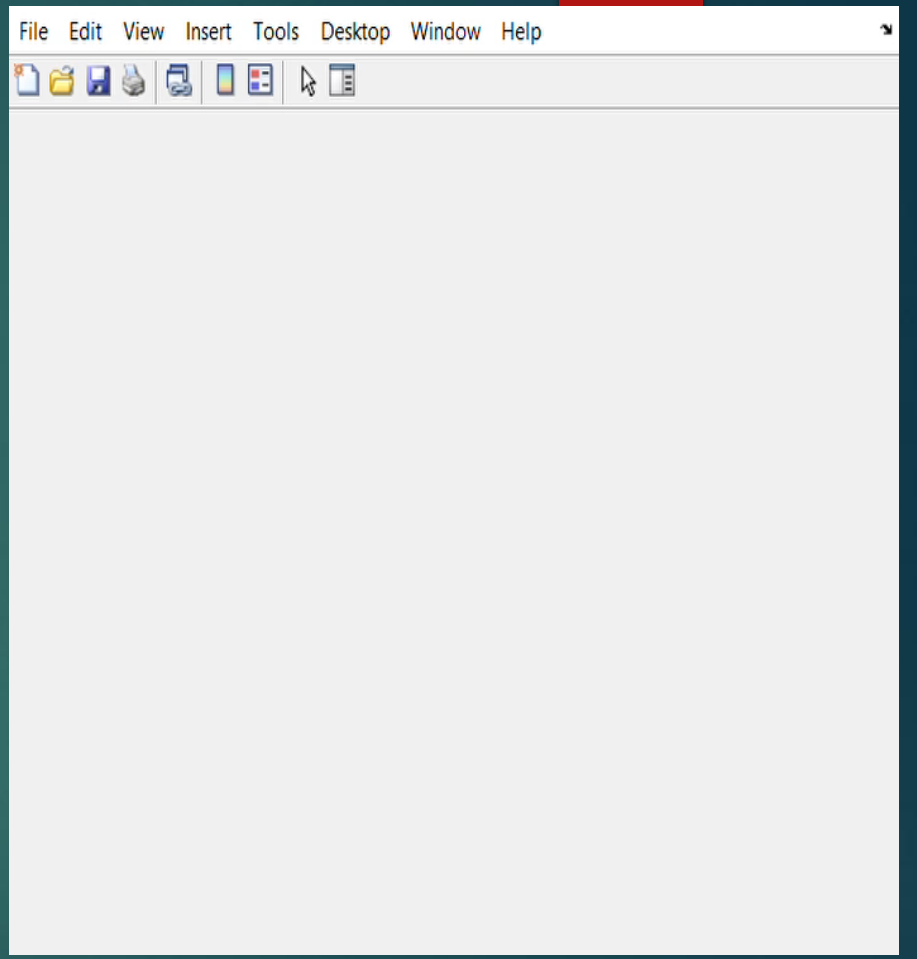
MATLAB CODE

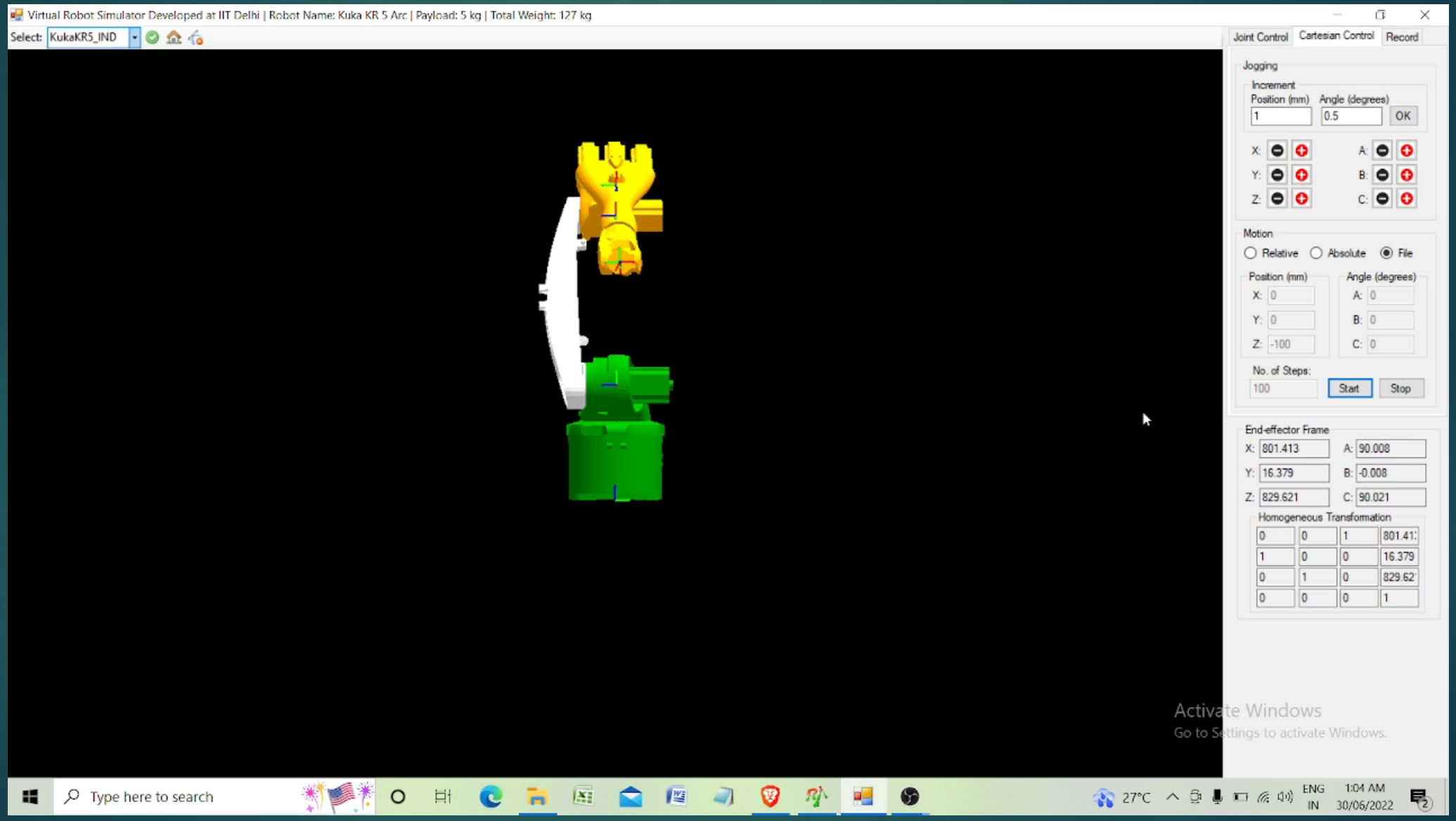
```
c1 = (p1+p2)/2;
radius = norm(p1 - c1);
thetaMin = 0;
thetaMax = pi;
thetaArray = linspace(thetaMin, thetaMax,n);
alreadyTrajectoryPoints = length(pXArray);

for i = 1:n
    theta = thetaArray(i);
    p = c1 +[0; radius*cos(theta);radius*sin(theta)];
    index = alreadyTrajectoryPoints + i;
    pXArray(index) = p(1);
    pYArray(index) = p(2);
    pZArray(index) = p(3);

end

c2 = (p2+p3)/2;
radius = norm((p3-c2));
alreadyTrajectoryPoints = length(pXArray);
for i = 1:n
    theta = thetaArray(i);
    p = c2 + [0; radius*cos(theta);radius*sin(theta)];
    index = alreadyTrajectoryPoints + i;
    pXArray(index) = p(1);
    pYArray(index) = p(2);
    pZArray(index) = p(3);
end

deltaP = pH-p3;
alreadyTrajectoryPoints = length(pXArray);
for i = 1:n
    t=tArray(i);
    p = p3 +t*deltaP;
    index = alreadyTrajectoryPoints+i;
    pXArray(index) = p(1);
    pYArray(index) = p(2);
    pZArray(index) = p(3);

end
```

```
pXOutput = pXArray';
pYOutput = pYArray';
pZOutput = pZArray';
pause(5)
for i = 1:1:length(pXOutput)
    px = pXArray(i);
    py = pYArray(i);
    pz = pZArray(i);

    plot([-110  110],[900  900], 'r')
    hold on;
    plot([0 0],[1150 740], 'r')
    hold on;
    plot(py,pz,'g*')

    hold on;
%     % figure;
%     plot(link1XArray,link1YArray,'r')
     pause(0.05)
%     hold off;
% axis equal
end
```

MATLAB OUTPUT



VERIFICATION IN ROBOANALYZER



VIRTUAL ROBOT MODULE(VRM) OF ROBOANALYZER

- IN THE VIDEO DEMONSTRATION OF OUR TEAM'S PROJECT OF GROUP NO 1 WE HAVE DRAWN:-
- DELHI MAP :- CAPITAL OF INDIA
- TAJ MAHAL
- TIGER :- NATIONAL ANIMAL OF INDIA
- MANGO :- NATIONAL FRUIT OF INDIA
- HOCKEY :- NATIONAL SPORTS OF INDIA
- LOTUS :- NATIONAL FLOWER OF INDIA
- NATIONAL FLAG OF INDIA

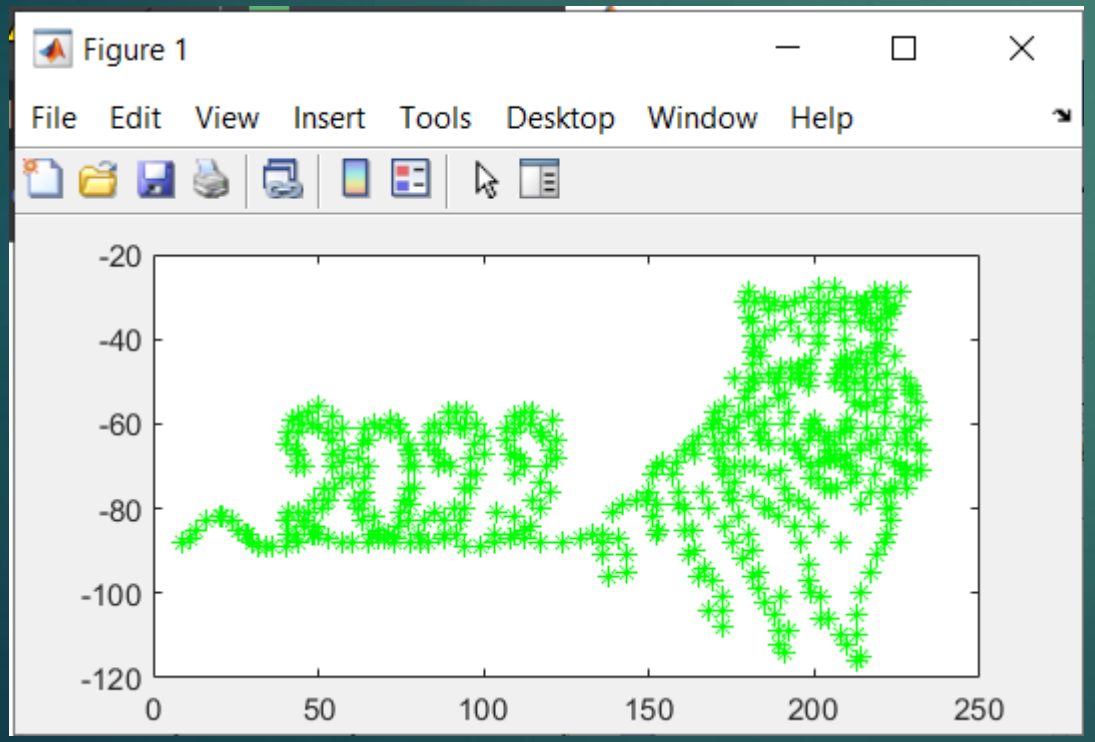
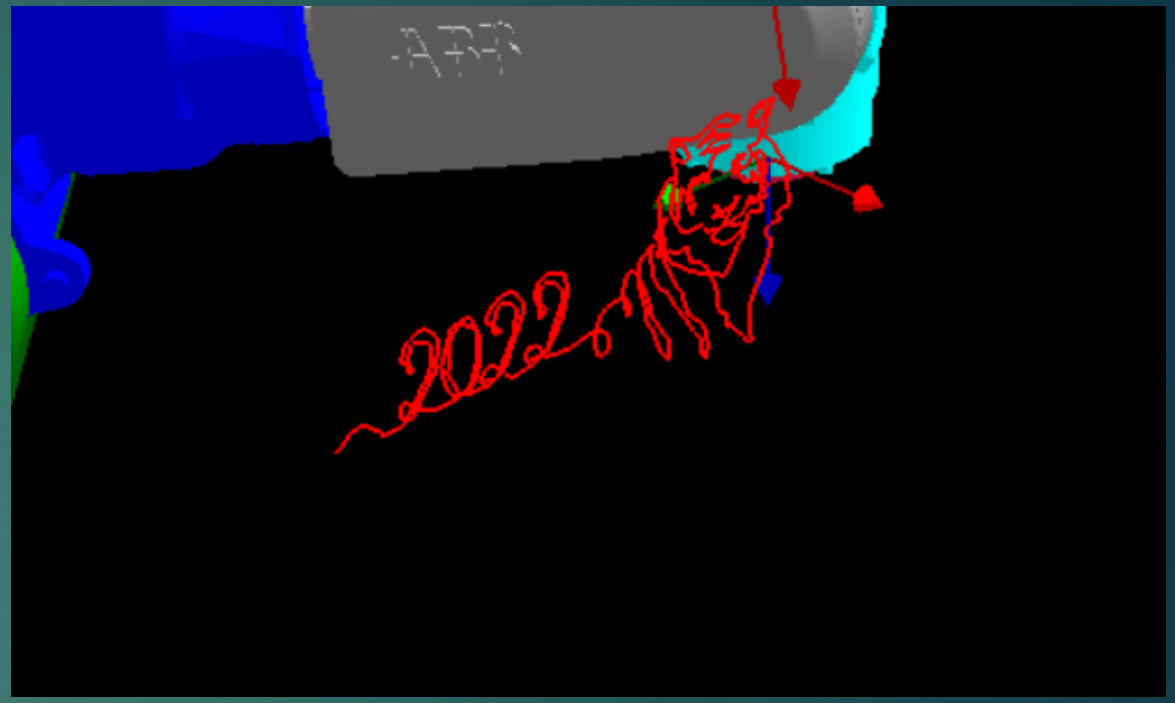
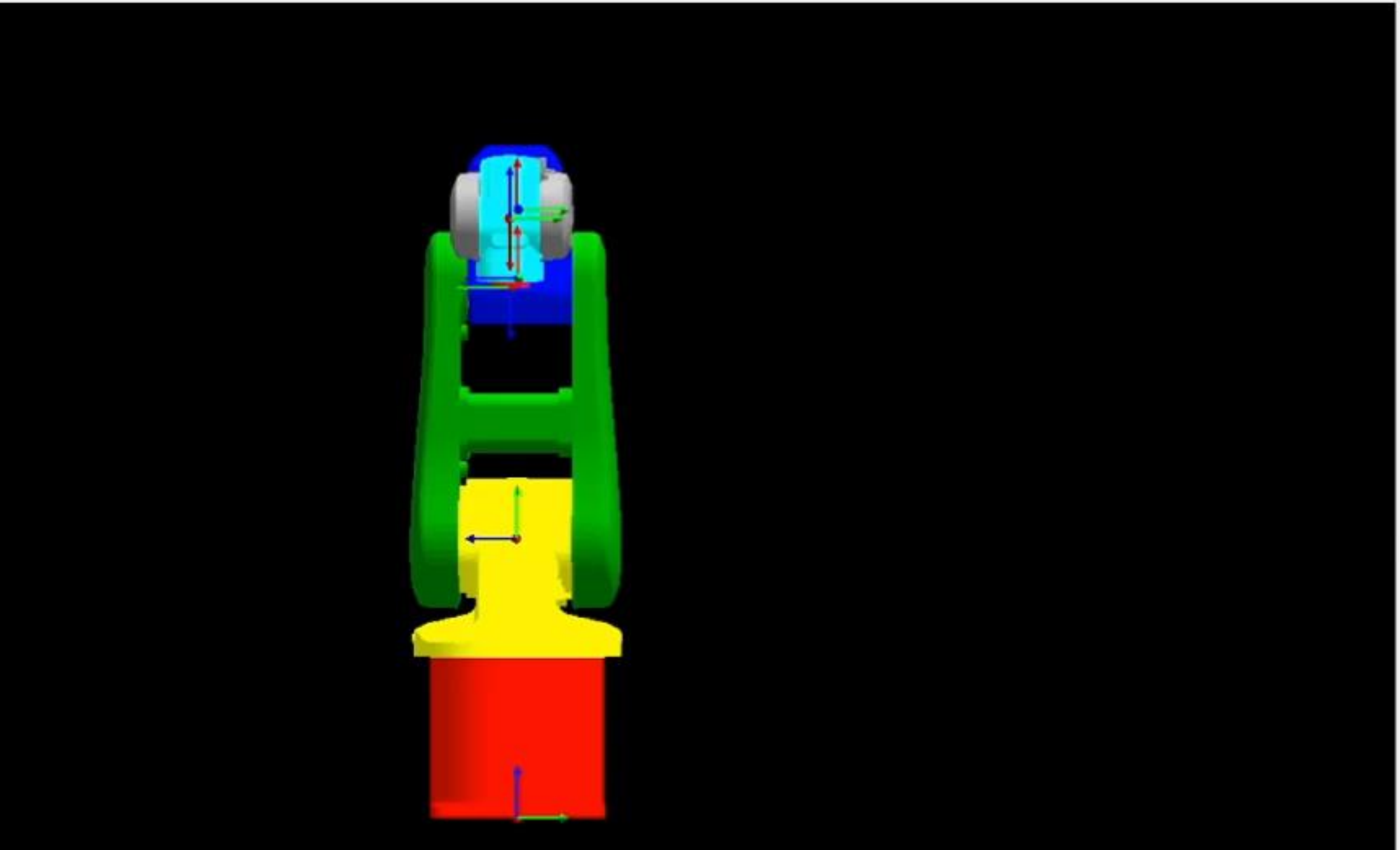


Figure 1
File Edit View Insert Tools Desktop Window Help
-20
-40
-60
-80
-100
-120
0
50
100
150
200
250


2022

| Robot Name: ABB IRB 120 | Payload: 3 kg | Total Weight: 25 kg



Joint Control | Cartesian Control

Jogging

Increment

Position (mm) | Angle (degree

1 | 0.5

X: ⊖ ⊕ A: ⊖

Y: ⊖ ⊕ B: ⊖

Z: ⊖ ⊕ C: ⊖

Motion

○ Relative ○ Absolute

Position (mm) | Angle (d

X: 0 | A: 0

Y: 0 | B: 0

Z: -100 | C: 0

No. of Steps:

100 | Start

End-effector Frame

X: 301.907 | A: -180

Y: -7.671 | B: 0

Z: 549.664 | C: 0

Homogeneous Transformati

1	0	0
0	-1	0
0	0	-1
0	0	0