

EE594-INDUSTRIAL ROBOTICS
AND AUTOMATION
ASSIGNMENT 1

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E/16/103

SEMESTER 7

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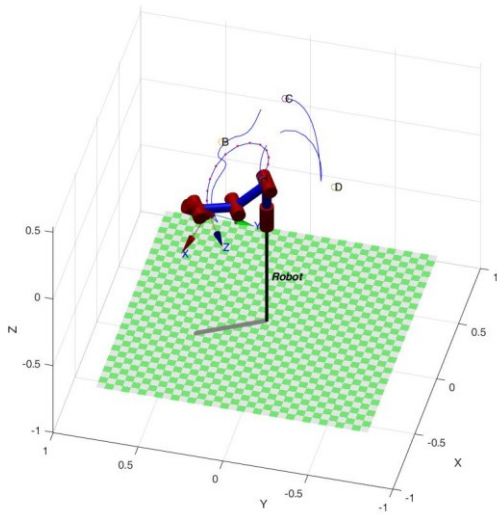


Figure 1 – H-A trajectory

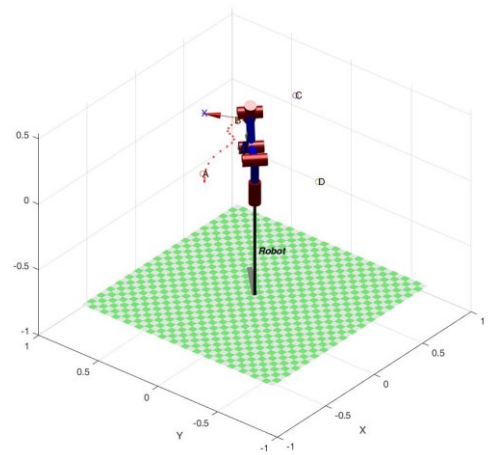


Figure 2 – A-B trajectory

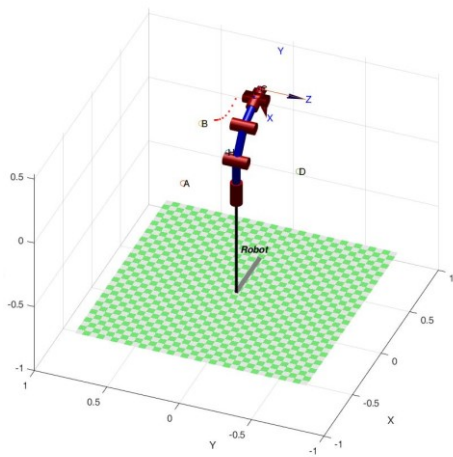


Figure 3 – B-C trajectory

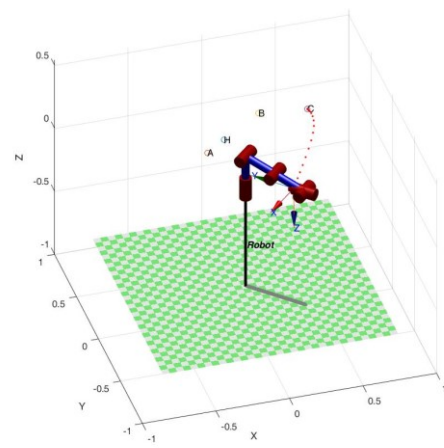


Figure 4 – C-D trajectory

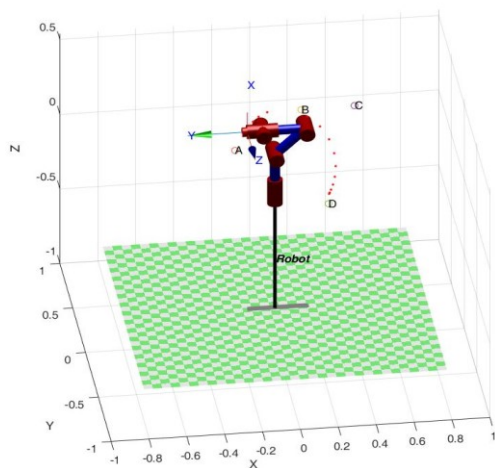


Figure 5 – D-H trajectory

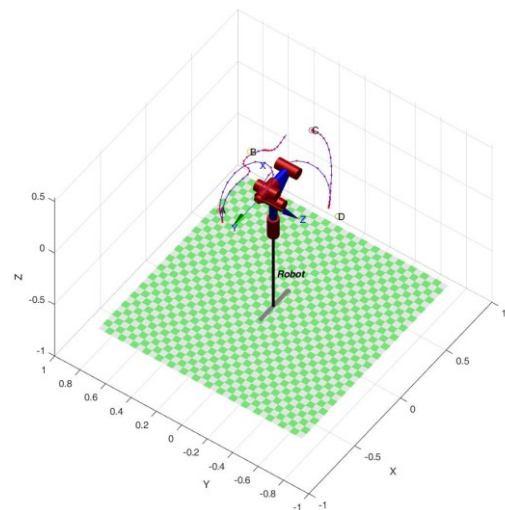


Figure 6 – H-A-B-C-D-H trajectory

MATLAB CODE

```
%link([theta      d      a      alpha])  connecting robot
arms
L(1)=Link([0      .24765      0      pi/2]);
L(2)=Link([0      0      .2286      0]);
L(3)=Link([0      0      .2286      0]);
L(4)=Link([0      0      0      -pi/2]);
L(5)=Link([0      .079375      0      pi/2]);
Robot=SerialLink(L);
Robot.name="Robot";
%F=Robot.fkine(qi)

%desired end effector ponts
H = SE3(-0.146, 0, 0.409) * SE3.rpy(0,-90,-180, 'deg');
%e number - 103 odd hence
Ay=0.3; Az=.01+103*0.4/420;
A = SE3(-0.17, Ay,Az) * SE3.rpy(-180,0,60, 'deg');
B = SE3(0.181, 0.313, 0.345) * SE3.rpy(-125, 26, 106,
'deg');
C = SE3(0.420, 0.000, 0.540) * SE3.rpy( 0, 70, 0, 'deg');
D = SE3(0.237, -0.338, 0.100) * SE3.rpy( 180, 0, -125,
'deg');

%time
t = [0:.1:2]';

%H - A joint angles configuration
qH=Robot.ikine(H,'mask',[1 1 1 0 1 1]);
qA=Robot.ikcon(A);
%trajectory H-A
q1 = jtraj(qH, qA, t);

%A-B straight line joint angles configuration
TAB = ctraj(A, B, length(t));
%trajectory A-B
q2 = Robot.ikunc(TAB);

%B-C-D joint angles configuration
qC=Robot.ikine(C,'mask',[1 1 1 0 1 1]); %qC=Robot.ikunc(C);
qD=Robot.ikunc(D);
%trajectory B-C-D
q3 = jtraj(qC, qD, t);
q2_3 = jtraj(q2(end,:), qC, t);

%D-H trajectory
q4 = jtraj(qD, qH, t);
```

```

% TDH = ctraj(D, H, length(t));
% q4 = Robot.ikunc(TDH);
% q5 = jtraj(q4(end,:), qH, t);

%ploting points ABCDH
plot3(-0.146, 0, 0.409,'o');hold on;text(-0.146, 0,
0.409,'H');
plot3(-0.17, Ay,Az,'o');hold on;text(-0.17, Ay,Az,'A');
plot3(0.181, 0.313, 0.345,'o');hold on;text(0.181, 0.313,
0.345,'B');
plot3(0.420, 0.000, 0.540,'o');hold on;text(0.420, 0.000,
0.540,'C');
plot3(0.237, -0.338, 0.100,'o');hold on;text(0.237, -0.338,
0.100,'D');

q = [q1;q2;q2_3;q3;q4];

EET = zeros(4,4);

for i = 1:length(q)
    EET = Robot.fkine(q(i,:));
    EEp(i,:)=transl(EET);
    plot2(EEp(i,:), 'r. ');hold on;
    Robot.plot(q(i,:));hold on;
    plot2(EEp, 'b');%pause(0.1);
    %saveas(gcf,['E:\sem 7\roboticcs\assignment\frame
2/filename' num2str(i) '.png'])
end

% Robot.plot(qC);hold on;plot3(-0.146, 0, 0.409,'y*');hold
on;text(-0.146, 0, 0.409,'H');
% plot3(-0.17, Ay,Az,'o');hold on;text(-0.17, Ay,Az,'A');
% plot3(0.181, 0.313, 0.345,'o');hold on;text(0.181, 0.313,
0.345,'B');
% plot3(0.420, 0.000, 0.540,'o');hold on;text(0.420, 0.000,
0.540,'C');
% plot3(0.237, -0.338, 0.100,'o');hold on;text(0.237, -
0.338, 0.100,'D')

```