```
% Choose directory
rootdir = ['D0810B2F4--/run1','D0810B1_5F4/run1', 'D0810B1F4--/
run1', 'D0810B1F3--/run1',...
    'D0810B1F2_5/run1','D0810B1F2--/run1'];

for a = 1:16:96
    DesiredEndEffectorVelocity = load(fullfile(rootdir(a:a
+15),"desiredEndEffectorVelocity.csv"));
    DesiredJointPosition = load(fullfile(rootdir(a:a
+15),"desiredJointPosition.csv"));
    JointPosition = load(fullfile(rootdir(a:a+15),"jointPosition.csv"));
    Time = load(fullfile(rootdir(a:a+15),"simulationTime.csv"));

    x = zeros(length(Time),3);
    xDot = zeros(length(Time)-1,3);

    for i =1:length(Time)
        [x(i,:), ~] = forwardKinematics(JointPosition(i,:));
    end
    for i =1:length(x)-1
        xDot(i,:) =  (x(i+1,:) - x(i,:)) / (Time(i+1)-Time(i));
    end

    % Desired Path and Derivative of Path
    radius = 0.08;
    line_length = 0.1;
    alpha = (2*line_length)/(radius*pi) + 1;

    % Time vector
    sspace = linspace(0, alpha + 1, length(Time));
    % Initilize parameters
    P_z = zeros(1,length(sspace));
    P_x = zeros(1,length(sspace));
    P_z_derivative = zeros(1,length(sspace));
    P_x_derivative = zeros(1,length(sspace));

    for i=1:length(sspace)
        s=sspace(i);
        if s <= 1
            % Calculate x and y coordinates of the first circle segment
            P_z(i) = -radius * cos(s*pi/2);
            P_x(i) = -radius * sin(s*pi/2);
            P_z_derivative(i) = radius * (pi/2) * sin(s * pi/2);
            P_x_derivative(i) = -radius * (pi/2) * cos(s * pi/2);

        elseif s <= alpha && s>1
            % Calculate the coordinates of the straight line segment
            P_z(i) = (s-1) * (radius * pi) / 2;
            P_x(i) = -radius * ones(1);
            P_z_derivative(1,i) = radius * pi / 2;
            P_x_derivative(1,i) = 0;
        else
```

```
            P_z(i) = radius * sin((s-alpha) * pi/2) + line_length;
            P_x(i) = -radius * cos((s-alpha) * pi/2);
            P_z_derivative(i) = radius * pi/2 * cos((s-alpha) * pi/2);
            P_x_derivative(i) = radius * pi/2 * sin((s-alpha) * pi/2);
        end

    end

    % Plotting
    figure(1)
    hold on;    grid on
    plot(x(:,3),-x(:,1), '.')
    if a==81
        plot(P_z + 0.515509+radius,P_x + 0.0210774,'LineWidth', 2.0)
    end
    xlabel('z direction (m)');    ylabel('x direction (m)')
    title('Desired and Actual Position');     axis('equal')

 legend('tB=2,tF=4','tB=1.5,tF=4','tB=1,tF=4','tB=1,tF=3','tB=1,tF=2.5','tB=1,tF=2','Desir
 Path')


    % figure(2)
    % hold on
    % grid on
    % % d1 = designfilt("lowpassiir",FilterOrder=12, ...
    % %     HalfPowerFrequency=0.15,DesignMethod="butter");
    % % y = filtfilt(d1,xDot(10:end,1));
    % plot(Time,DesiredEndEffectorVelocity(:,1),'LineWidth', 2.0)
    %
    % plot(Time(10:end-1),xDot(10:end,1),'LineWidth', 2.0, 'LineWidth', 2.0)
    % xlabel('Time (s)')
    % ylabel('Velocity (m/s)')
    % title('Velocity in X direction')
    % legend('Desired Velocity','Actual Velocity1','Actual Velocity2','Actual
 Velocity3')
    %
    % figure(3)
    % hold on
    % grid on
    % % d1 = designfilt("lowpassiir",FilterOrder=12, ...
    % %     HalfPowerFrequency=0.15,DesignMethod="butter");
    % % y = filtfilt(d1,xDot(10:end,3));
    % % plot(Time,P_z_derivative' .* sDot,'LineWidth', 2.0)
    % plot(Time(10:end-1),xDot(10:end,3),'LineWidth', 2.0)
    % plot(Time,DesiredEndEffectorVelocity(:,3),'LineWidth', 2.0)
    %
    % xlabel('Time (s)')
    % ylabel('Velocity (m/s)')
    % title('Velocity in Z direction')
    % legend('Desired velocity','Actual Velocity1','Actual Velocity2','Actual
 Velocity3')

end
```

```
Warning: Ignoring extra legend entries.
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Warning: Ignoring extra legend entries.
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Warning: Ignoring extra legend entries.
```

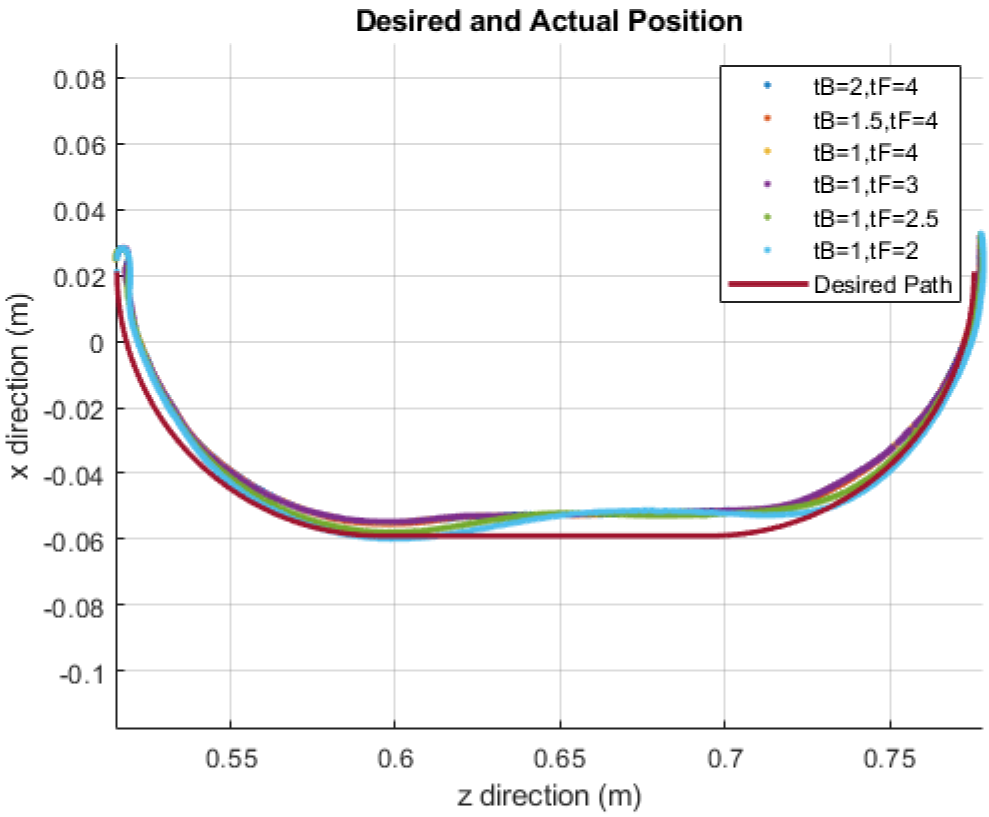

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