



WHEEL MOBILE ROBOTS - KINEMATICS

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Assumptions:

We assume a two wheeled mobile robot along a path consisting of 5 different segments:

Startup, straight line movement, arc movement, straight line movement, deceleration and stop.

Acceleration time: 2s

Max speed: 1m/s

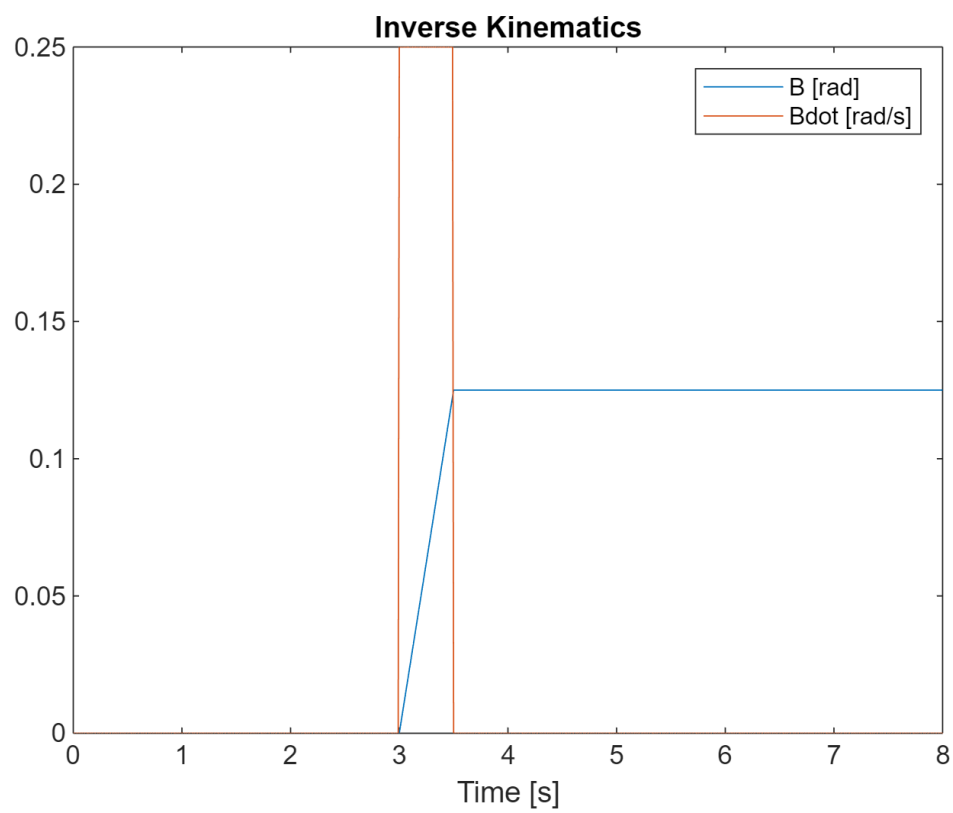
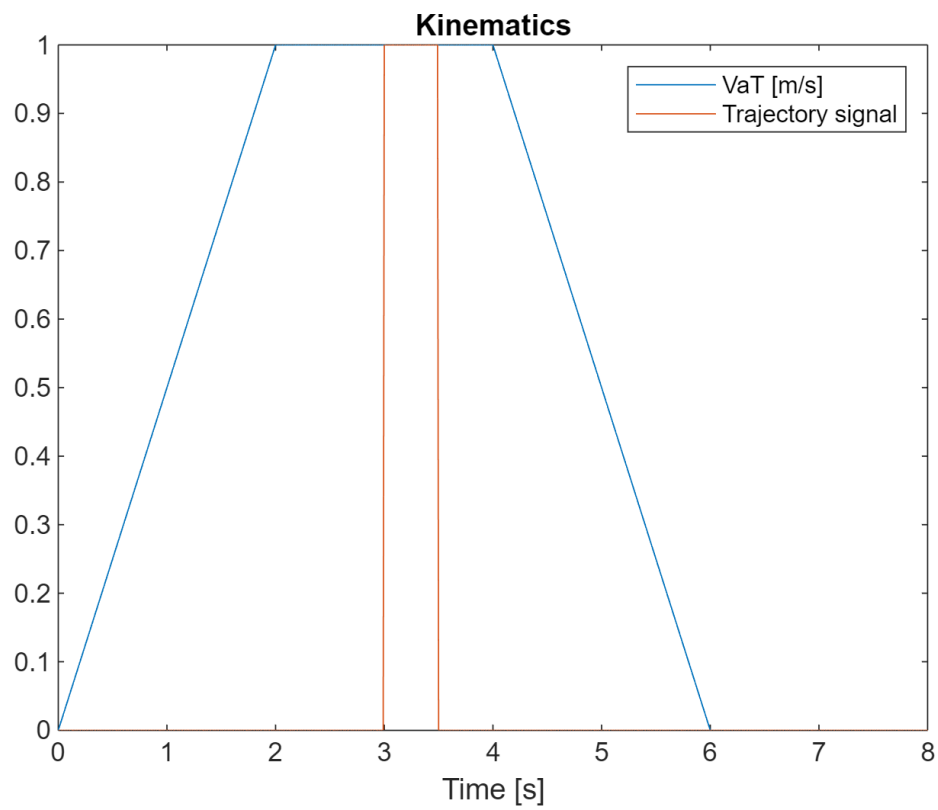
Straight line movement: 1s

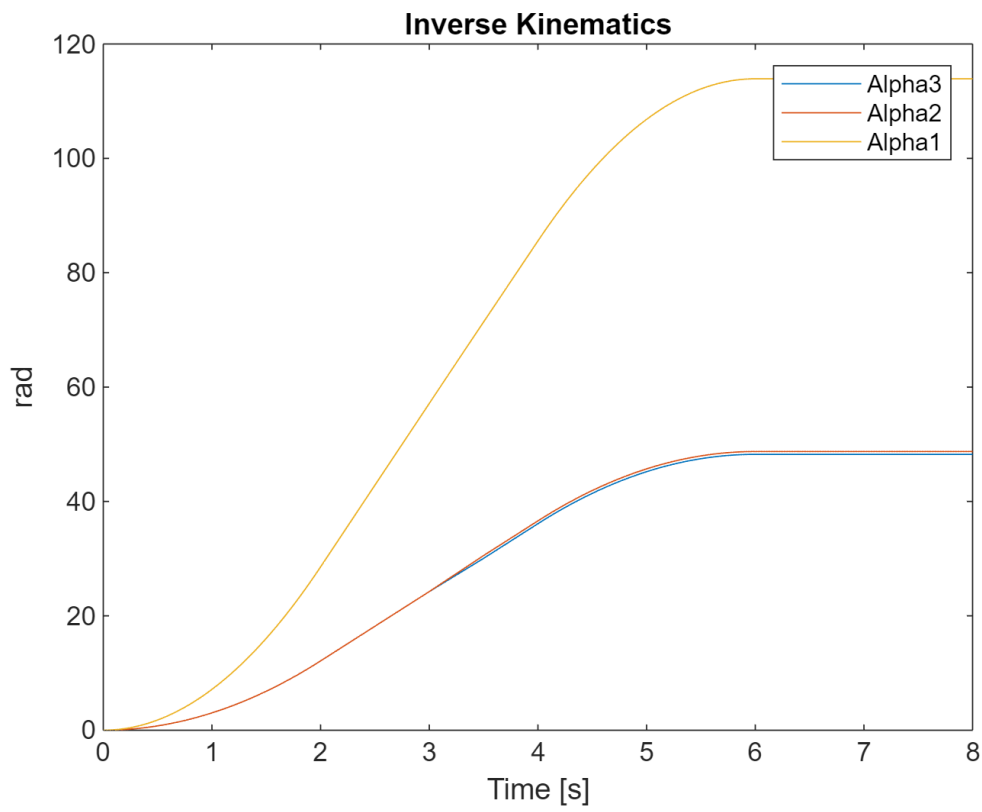
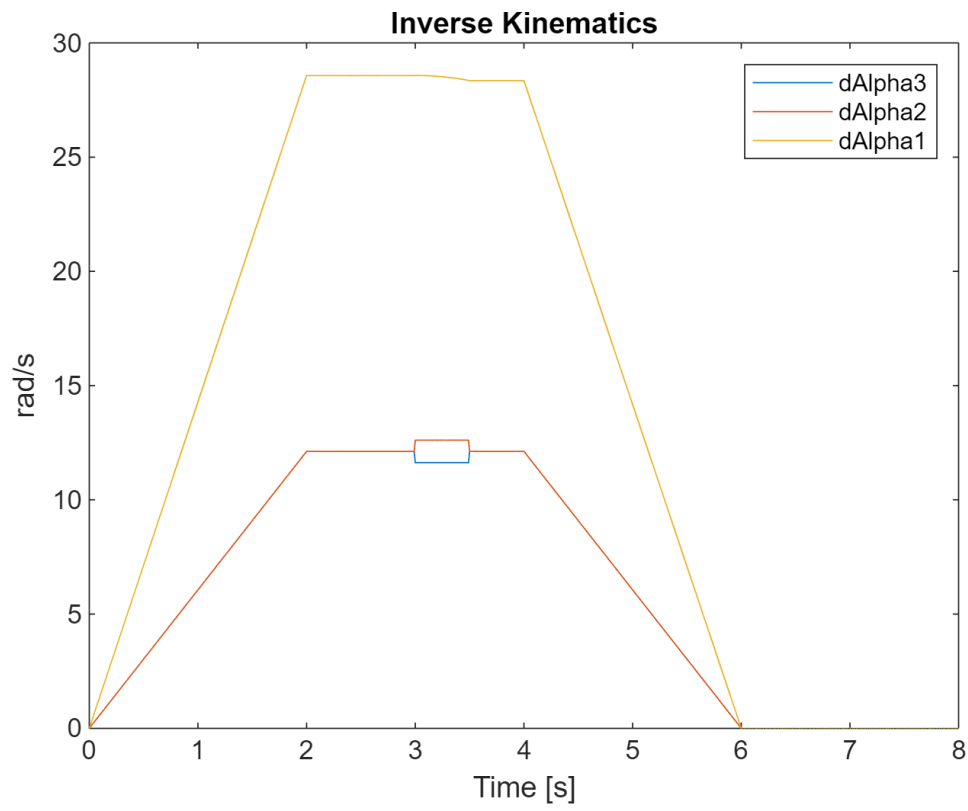
Arc movement: 0.5s $R=4m$

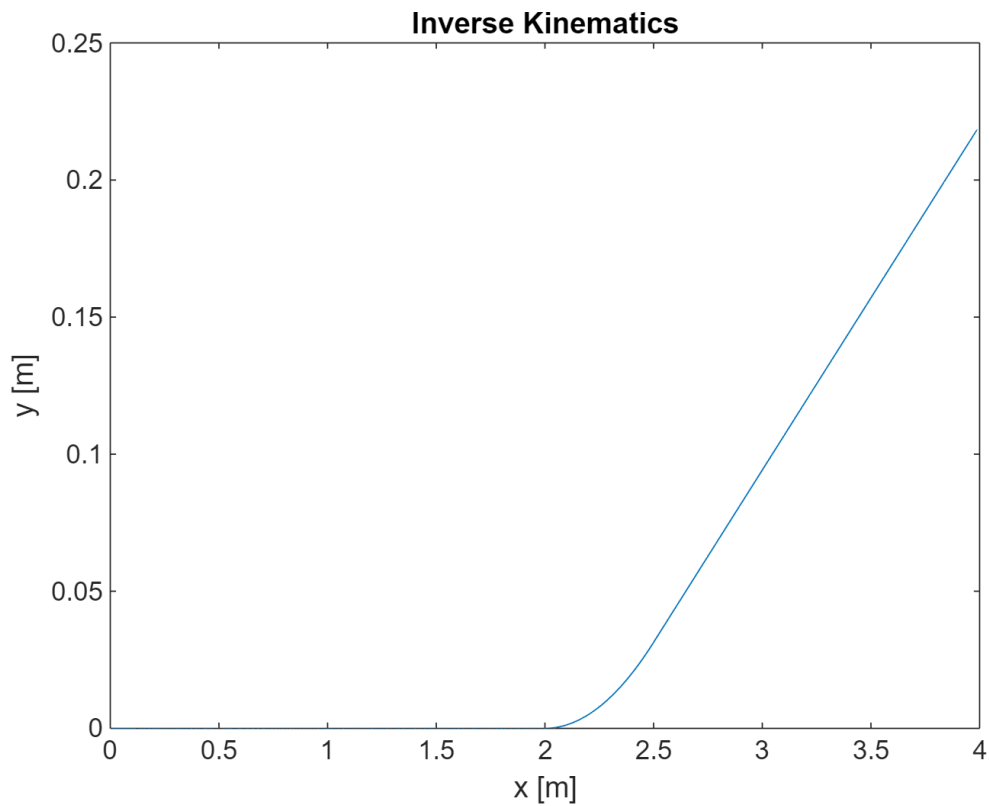
Straight line movement: 0.5s

Deceleration time: 2s

```
clear  
load out.mat  
dataobj=out.simout;  
labPlot(dataobj)
```







Assumptions 2:

We assume a two wheeled mobile robot along a path consisting of 5 different segments:

Startup, straight line movement, arc movement, straight line movement, deceleration and stop.

Acceleration time: 2s

Max speed: 1m/s

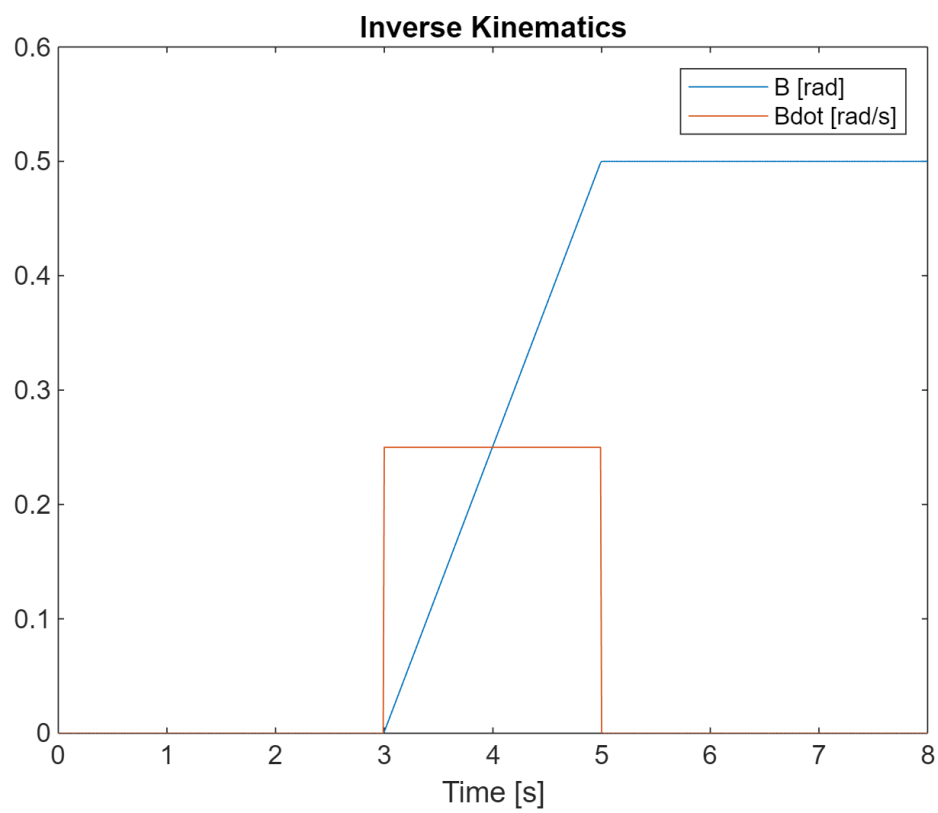
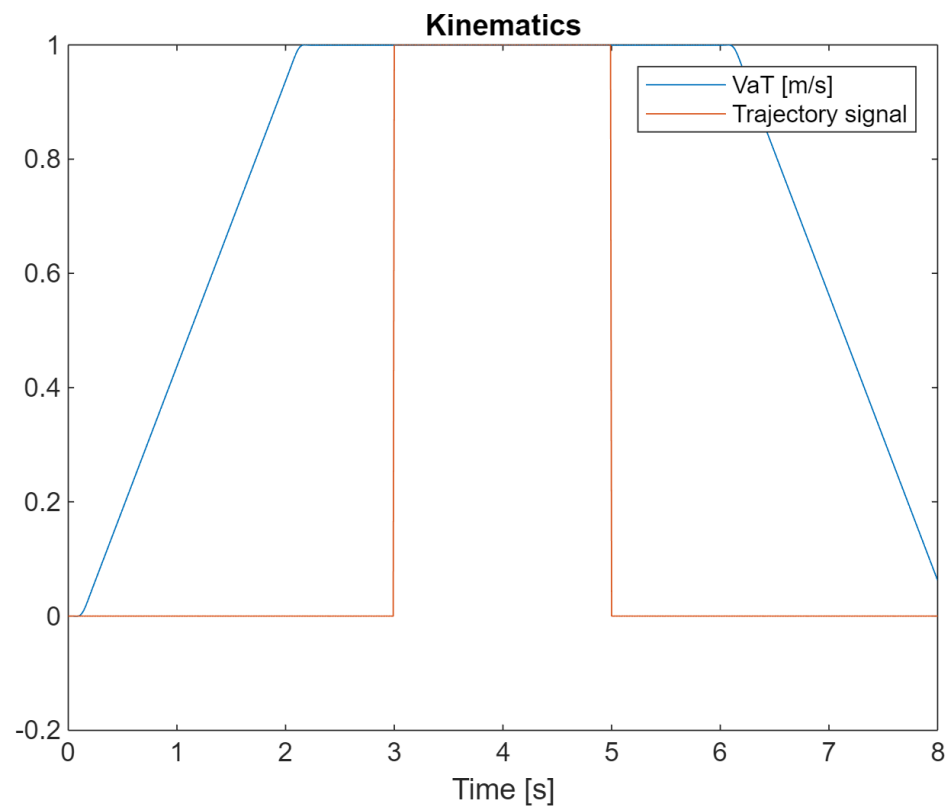
Straight line movement: 1s

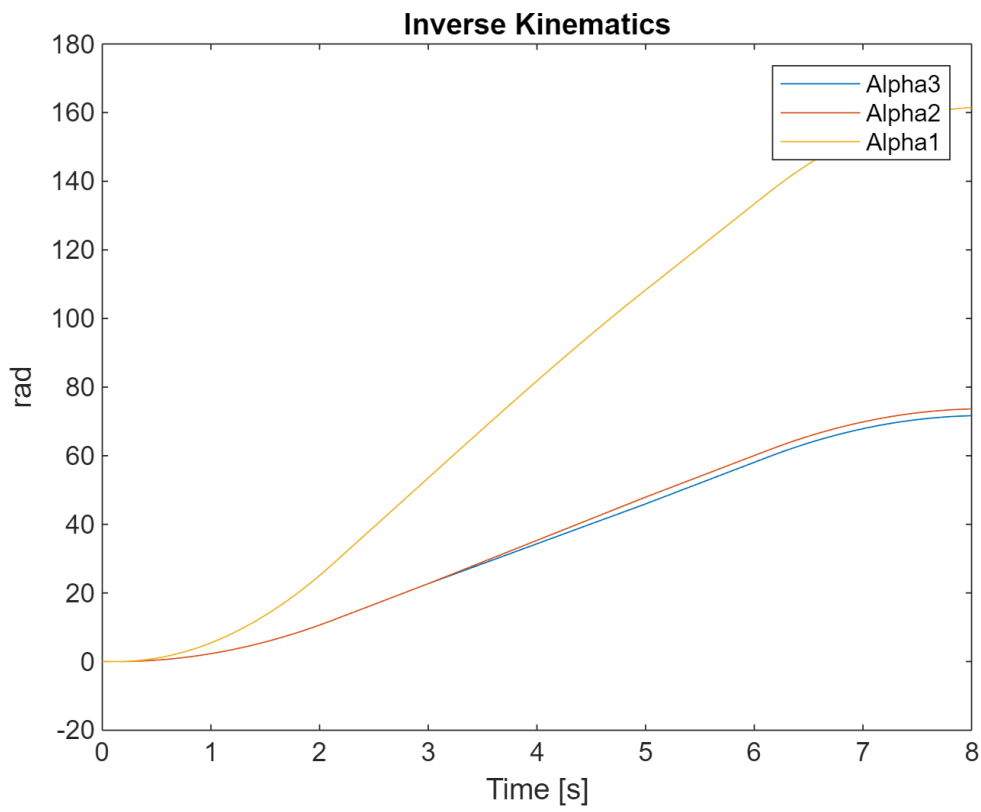
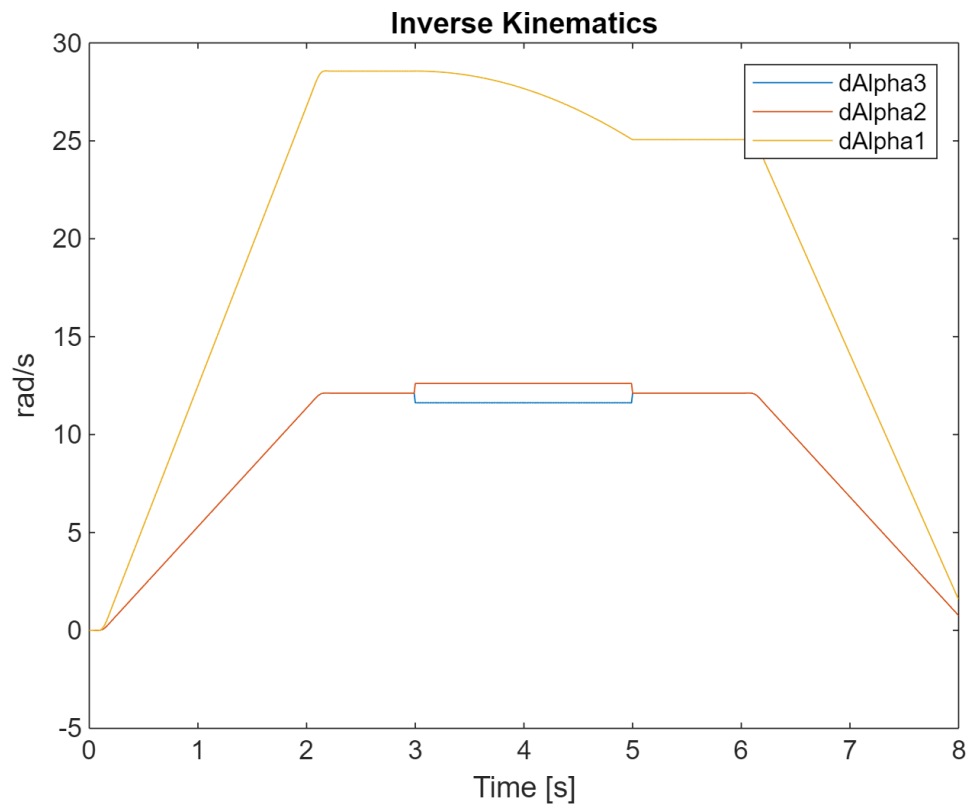
Arc movement: 2s $R=4m$

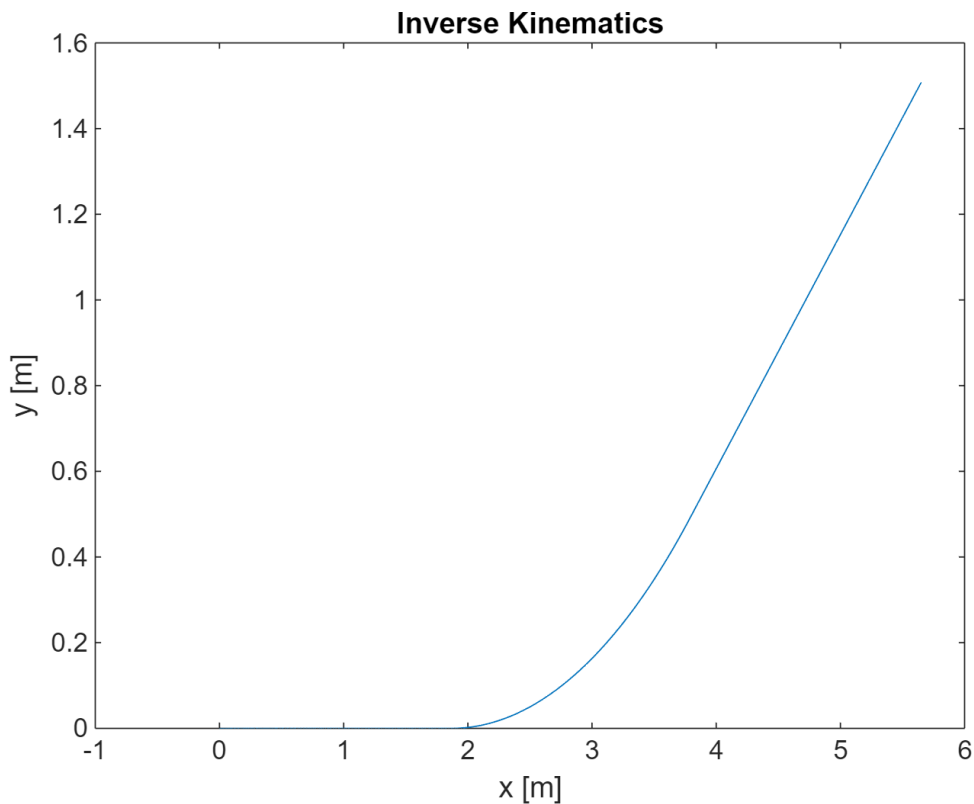
Straight line movement: 1s

Deceleration time: 2s

```
dataobj2=out.simout1;  
labPlot(dataobj2)
```







```
function labPlot(dataobj)
t=dataobj.Time;
VaT=dataobj.Data(:,2);
sig=dataobj.Data(:,1);
figure
plot(t,VaT,t,sig)
title('Kinematics')
xlabel('Time [s]')
legend('VaT [m/s]', 'Trajectory signal')
```

```
B=dataobj.Data(:,4);
Bdot=dataobj.Data(:,3);
figure
plot(t,B,t,Bdot)
title('Inverse Kinematics')
xlabel('Time [s]')
legend('B [rad]', 'Bdot [rad/s]')
```

```
a1=dataobj.Data(:,7);
a2=dataobj.Data(:,8);
a3=dataobj.Data(:,9);
figure
plot(t,a1,t,a2,t,a3)
title('Inverse Kinematics')
xlabel('Time [s]')
ylabel('rad/s')
```

```
legend('dAlpha3','dAlpha2','dAlpha1')
```

```
da1=dataobj.Data(:,10);  
da2=dataobj.Data(:,11);  
da3=dataobj.Data(:,12);  
figure  
plot(t,da1,t,da2,t,da3)  
title('Inverse Kinematics')  
xlabel('Time [s]')  
ylabel('rad')  
legend('Alpha3','Alpha2','Alpha1')
```

```
x=dataobj.Data(:,5);  
y=dataobj.Data(:,6);  
figure  
plot(x,y)  
title('Inverse Kinematics')  
xlabel('x [m]')  
ylabel('y [m]')  
end
```