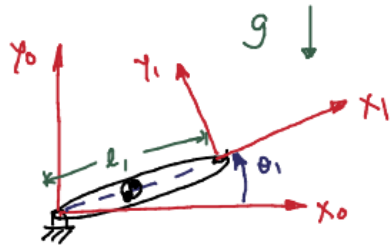


```
clc
close all
clear all
```

Simulation of a single link pendulum



Find the equation of motion of the one link manipulator using Euler-Lagrange Method.

{Center of mass is mid-way of the link}

SOLUTION

Link i	a_i	α_i	d_i	θ_i
1	l_1	0	0	θ_1

%DH for link 1 except q_i

```
parms.a1 = 1;
parms.alpha1 = 0;
parms.d1=0;
```

%mass, inertia and gravity.

```
parms.m1 = 1;
parms.I1 = 0.5;
parms.g = 10;
```

%stuff for animation

```
parms.time_delay = 0.1; %delay between frames, will need some fine tuning for diff
parms.framespersec = 30;
```

%step size for integration. Accuracy increases as h decreases

```
h = 0.001;
```

%set the time

```
t0 = 0; %start time
tN = 2; %end time
N = (tN-t0)/h;
t = linspace(t0,tN,N);
```

%initial conditions

```
theta1 = 0; %initial position
theta1dot = 0;%final position
x0=[theta1 theta1dot]';
```

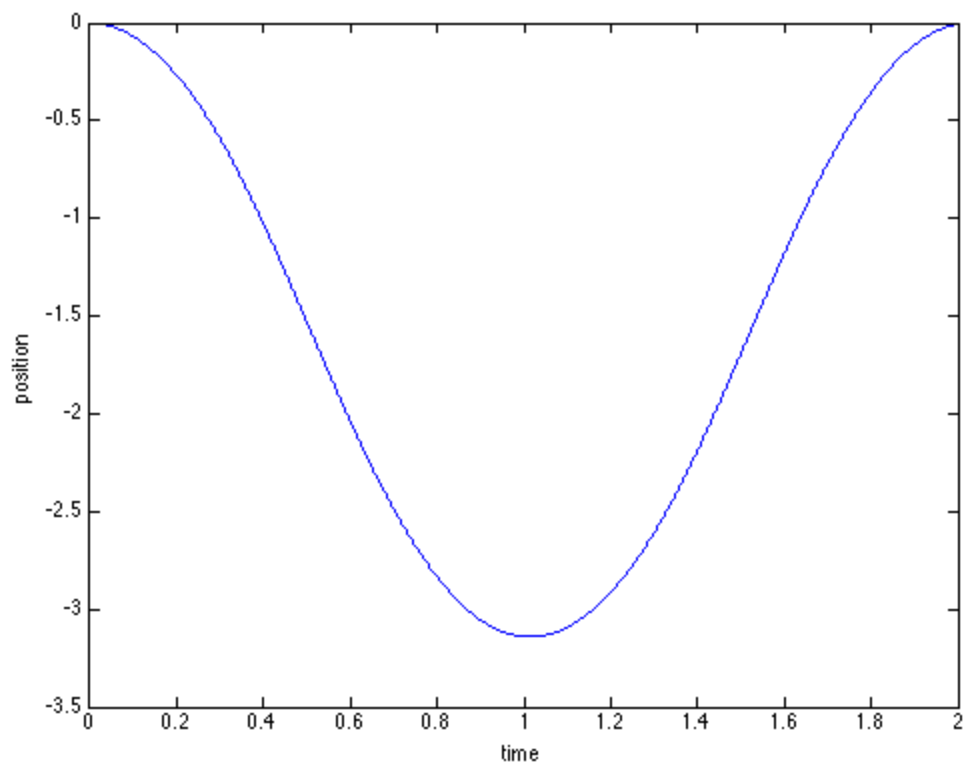
%integrate equations of motion

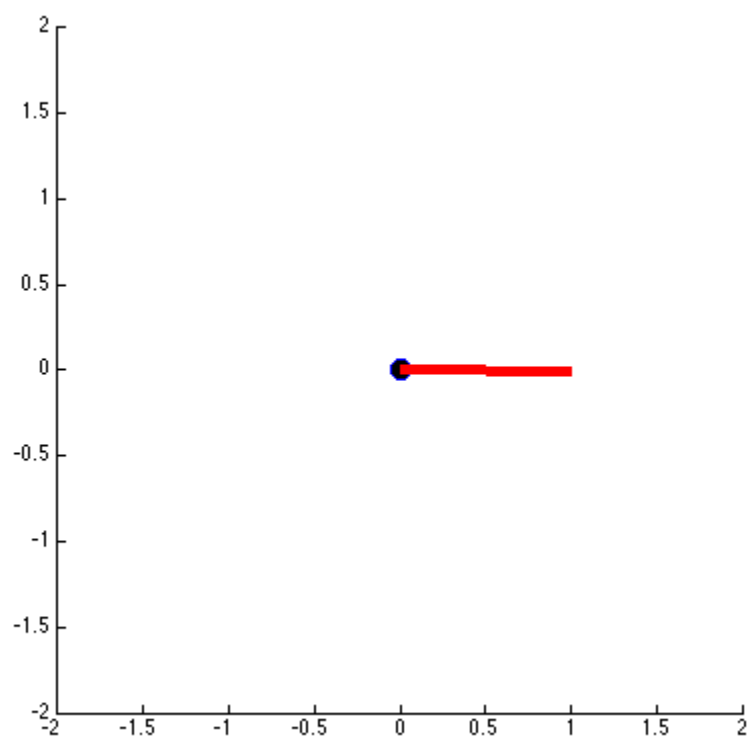
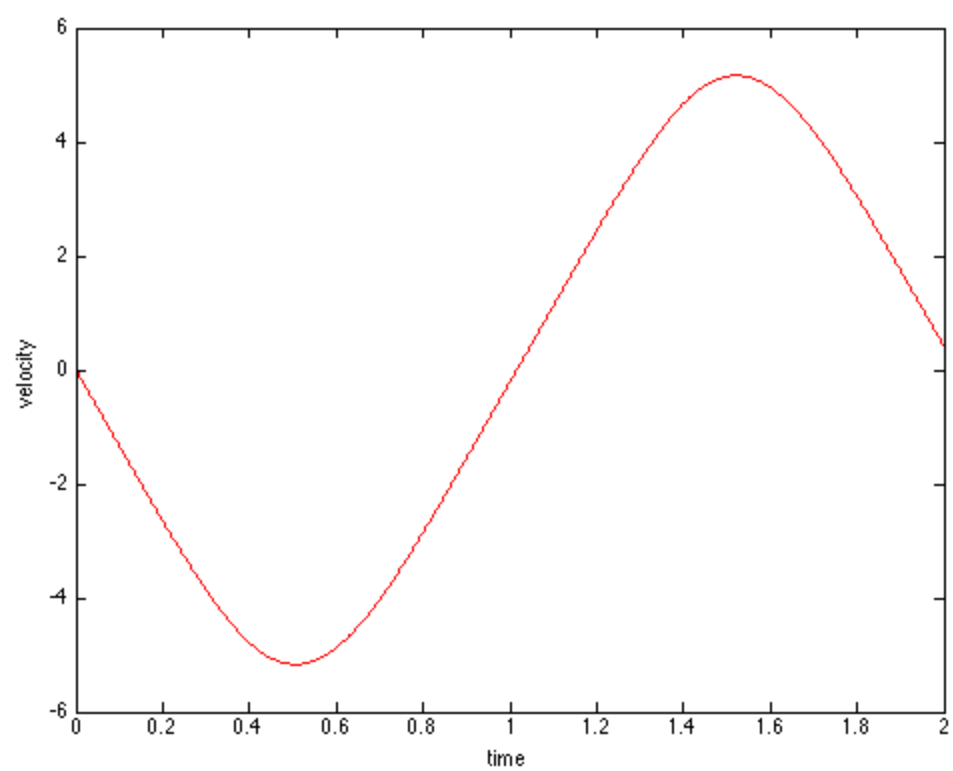
```
x = ode4('onelink_rhs',t,x0,parms);
```

```
%do some plots
figure(1)
plot(t,x(:,1),'b');
xlabel('time');
ylabel('position');

figure(2)
plot(t,x(:,2),'r');
xlabel('time');
ylabel('velocity');

figure(3) %animation
onelink_animation(t,x(:,1),parms);
```





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