

Assignment 1 Laboratory

Index No 18001149

1)

```
1 1;  
2 function [x,y,t] = f_trajectory(h =5,g = 9.81,v = 25,theta = pi/4,t=[])  
3  
4 t = 0:0.1:5;  
5  
6 #declaring the Equations  
7  
8 x = v*cos(theta).*t;  
9 y = h+v*sin(theta).*t-0.5*g.*t.*t;  
10  
11  
12 endfunction  
13  
14  
15 function [x,y,t] = traject()  
16 [x,y,t] = f_trajectory();  
17  
18 endfunction  
19  
20
```

OutPut:-

```
>> Q1  
x =  
Columns 1 through 8:  
    0.0000    1.7677    3.5355    5.3033    7.0710    8.8388    10.6066    12.3743  
Columns 9 through 16:  
    14.1421    15.9099    17.6777    19.4454    21.2132    22.9809    24.7487    26.5165  
Columns 17 through 24:  
    28.2842    30.0520    31.8198    33.5875    35.3553    37.1231    38.8908    40.6586  
Columns 25 through 32:  
    42.4264    44.1941    45.9619    47.7297    49.4974    51.2652    53.0330    54.8007  
Columns 33 through 40:  
    56.5685    58.3363    60.1040    61.8718    63.6396    65.4073    67.1751    68.9429  
Columns 41 through 48:  
    70.7106    72.4784    74.2462    76.0139    77.7817    79.5495    81.3172    83.0850  
Columns 49 through 51:  
    84.8528    86.6205    88.3883
```

Name	Class	Dimension	Value
ans	double	1x1	1
t	double	1x51	0:0.1:5
x	double	1x51	0:1.76777:88.3883
y	double	1x51	[5, 6.7187, 8.3393, 9.8619, 11.286, 12.613, 13.841, 14....

Y =

Columns 1 through 9:

5.00000	6.71872	8.33933	9.86185	11.28627	12.61258	13.84080	14.97092	16.00294
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Columns 10 through 18:

16.93685	17.77267	18.51039	19.15000	19.69152	20.13494	20.48025	20.72747	20.87659
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Columns 19 through 27:

20.92761	20.88052	20.73534	20.49206	20.15067	19.71119	19.17361	18.53792	17.80414
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Columns 28 through 36:

16.97226	16.04227	15.01419	13.88801	12.66373	11.34134	9.92086	8.40228	6.78559
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Columns 37 through 45:

5.07081	3.25793	1.34694	-0.66214	-2.76932	-4.97460	-7.27799	-9.67947	-12.17905
---------	---------	---------	----------	----------	----------	----------	----------	-----------

Columns 46 through 51:

-14.77674	-17.47252	-20.26640	-23.15839	-26.14847	-29.23665
-----------	-----------	-----------	-----------	-----------	-----------

t =

Columns 1 through 9:

0.00000	0.10000	0.20000	0.30000	0.40000	0.50000	0.60000	0.70000	0.80000
---------	---------	---------	---------	---------	---------	---------	---------	---------

Columns 10 through 18:

0.90000	1.00000	1.10000	1.20000	1.30000	1.40000	1.50000	1.60000	1.70000
---------	---------	---------	---------	---------	---------	---------	---------	---------

Columns 19 through 27:

1.80000	1.90000	2.00000	2.10000	2.20000	2.30000	2.40000	2.50000	2.60000
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Columns 28 through 36:

2.70000	2.80000	2.90000	3.00000	3.10000	3.20000	3.30000	3.40000	3.50000
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Columns 37 through 45:

3.60000	3.70000	3.80000	3.90000	4.00000	4.10000	4.20000	4.30000	4.40000
---------	---------	---------	---------	---------	---------	---------	---------	---------

Columns 46 through 51:

4.50000	4.60000	4.70000	4.80000	4.90000	5.00000
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2)

```
function [x,y,t] = trajet()  
[x,y,t] = f_trajectory();
```

```
endfunction
```

```
[x,y,t]=trajet()
```

```
hold on
```

```
subplot(1,2,1);
```

```
plot(t,x,'r--',t,y,'g--');
```

```
grid on
```

```
xlabel('Time');
```

```
ylabel('Distance/Height');
```

```
subplot(1,2,2);
```

```
plot3(t,x,y,'b--');
```

```
grid on
```

```
xlabel('t');
```

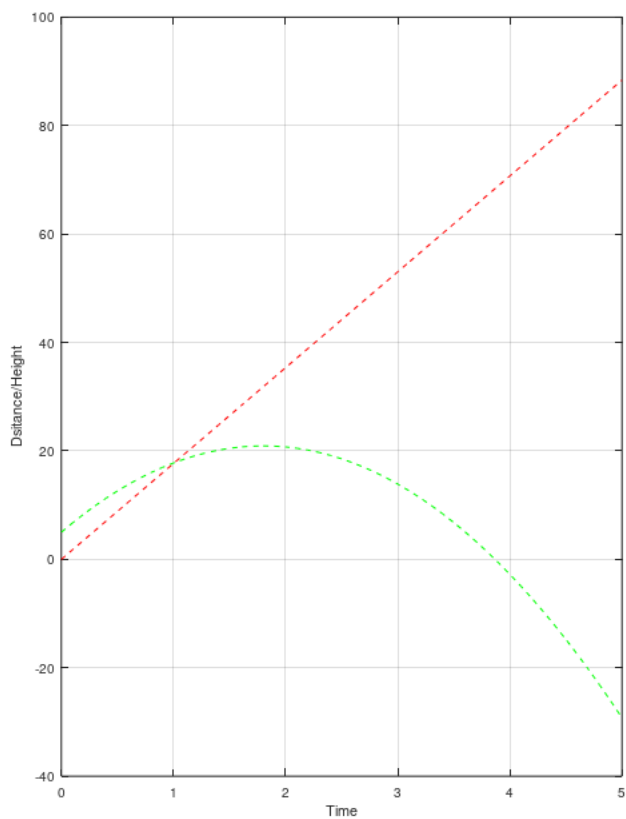
```
ylabel('x(t)');
```

```
zlabel('y(t)');
```

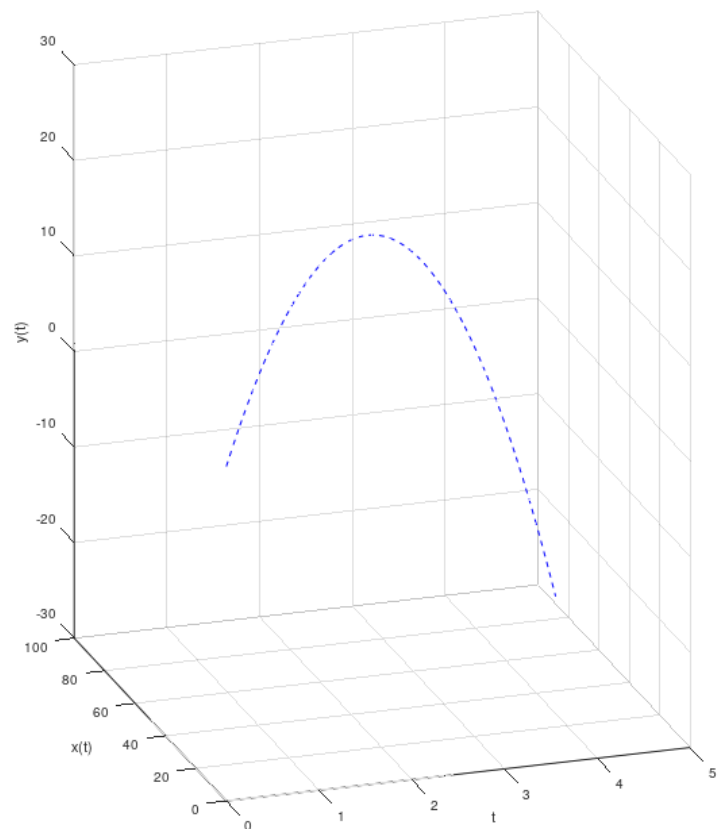
```
axis on
```

```
hold off
```

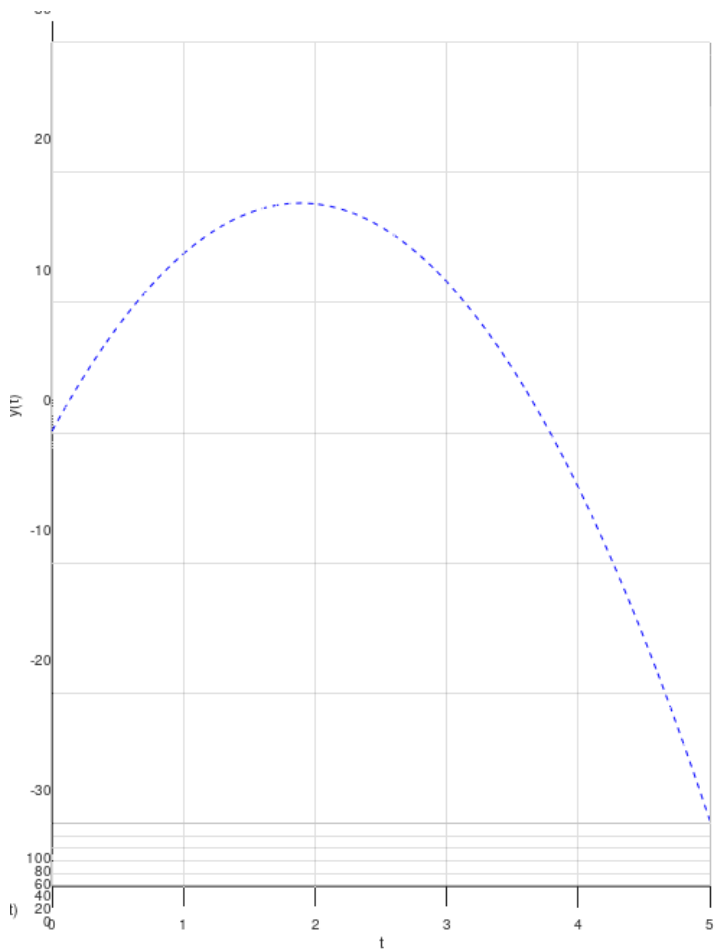
Plot1 Equation 1,2 Plot



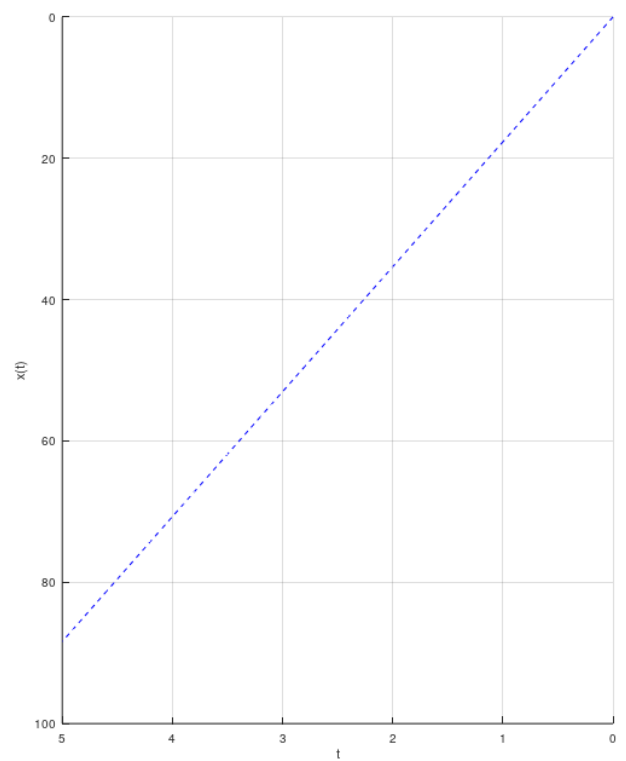
Plot2 Equation 3D Plot



Plot2 Equation 3D Plot (y-t)

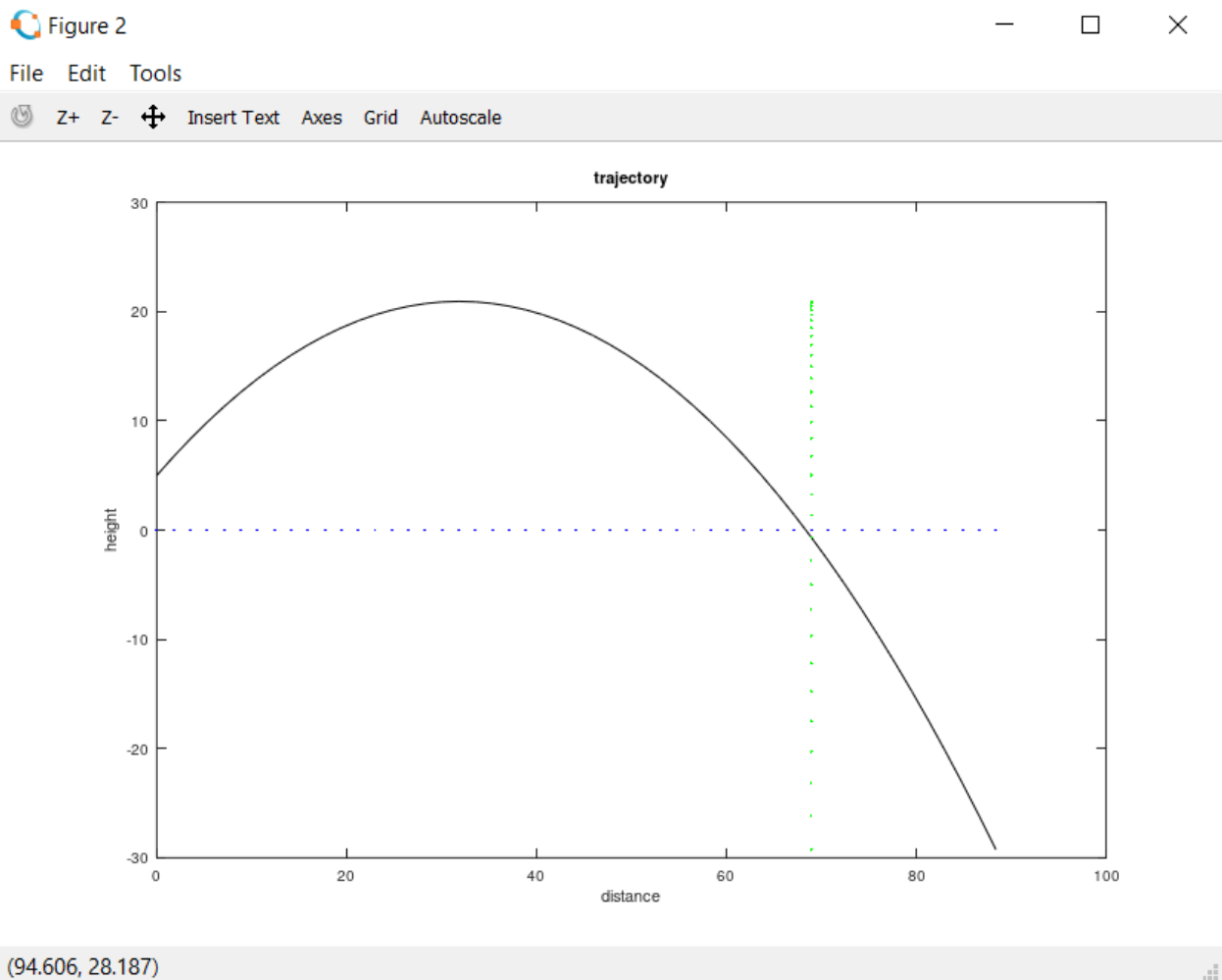


Plot2 Equation 3D Plot (x-t)



3)

```
ind=find(y<0);  
ground= ind(:,1)  
  
xcrosspoint=x(ground);  
printf("X nearest crossing point is %d",xcrosspoint);  
figure(2)  
plot(x,y,'k')  
  
xlabel('distance')  
ylabel('height')  
title('trajectory')  
  
hold on  
plot(x,0,'b')  
hold on  
plot(xcrosspoint,y,'g')
```



```
t =  
Columns 1 through 11:  
    0.00000    0.10000    0.20000    0.30000    0.40000    0.50000    0.60000    0.70000  
Columns 12 through 22:  
    1.10000    1.20000    1.30000    1.40000    1.50000    1.60000    1.70000    1.80000  
Columns 23 through 33:  
    2.20000    2.30000    2.40000    2.50000    2.60000    2.70000    2.80000    2.90000  
Columns 34 through 44:  
    3.30000    3.40000    3.50000    3.60000    3.70000    3.80000    3.90000    4.00000  
Columns 45 through 51:  
    4.40000    4.50000    4.60000    4.70000    4.80000    4.90000    5.00000  
ground = 40  
>> |
```