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Computer Engineering

16/ENG03/033

Mathlab Mid Semester Test

(a)

Input

```
commandwindow
clear
clc
close all
a=[0 10 4 -2;-3 -17 1 2;1 1 1 0;8 -34 16 -10];
b=[4; 2; 6; 4;]
c=inv(a)
d=c*b
```

Output

```
b =

     4
     2
     6
     4


c =

   -0.1786   -0.1020    0.5714    0.0153
    0.0357   -0.0153    0.0357   -0.0102
    0.1429    0.1173    0.3929   -0.0051
   -0.0357    0.1582    0.9643   -0.0612


d =

    2.5714
    0.2857
    3.1429
    5.7143

>>
```

(b)

Input

```
commandwindow
clear
clc
close all
syms t
d=1.5*exp(-0.75*t)*sin(0.85*t)+0.375*t
tn=[0:0.01:2.5];
dn=subs(d,tn);
v=diff(d)
vn=subs(v,tn);
figure(1)
plot(tn,vn)
xlabel('time(min)')
ylabel('velocity(km/min)')
grid on
grid minor
a=diff(v)
an=subs(a,tn);
figure(2)
plot(tn,an)
xlabel('time(min)')
ylabel('velocity(km/min)')
grid on
grid minor
figure(3)
plot(tn,vn,tn,an)
axis tight
grid on
grid minor
xlabel('time(mins)')
ylabel('variable')
legend('velocity(km/mins)','acceleration(km/mins^2)')
```

Output

```
d =

(3*t)/8 + (3*sin((17*t)/20)*exp(-(3*t)/4))/2


v =

(51*cos((17*t)/20)*exp(-(3*t)/4))/40 - (9*sin((17*t)/20)*exp(-
(3*t)/4))/8 + 3/8


a =
```

```
- (153*cos((17*t)/20)*exp(-(3*t)/4))/80 -
(6*sin((17*t)/20)*exp(-(3*t)/4))/25

>>
```

Figure 1

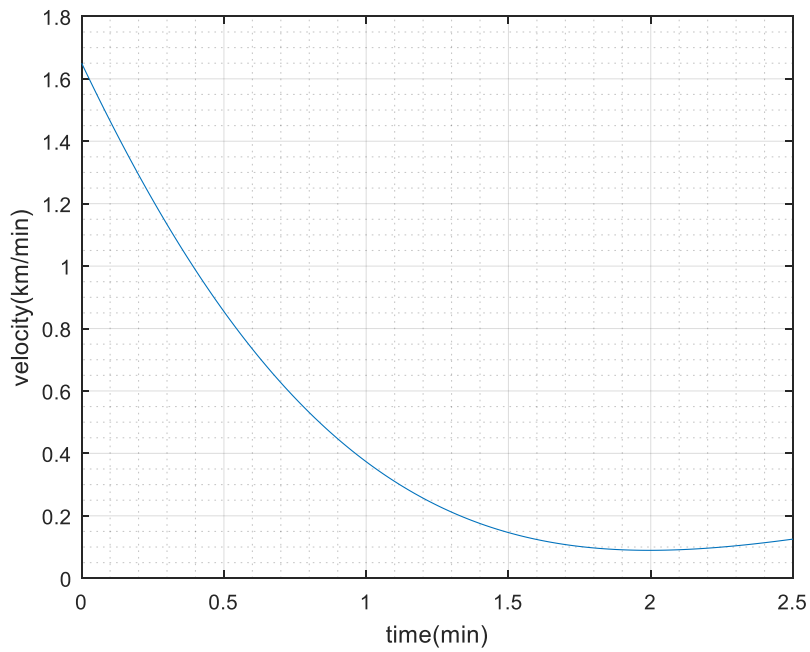


Figure 2

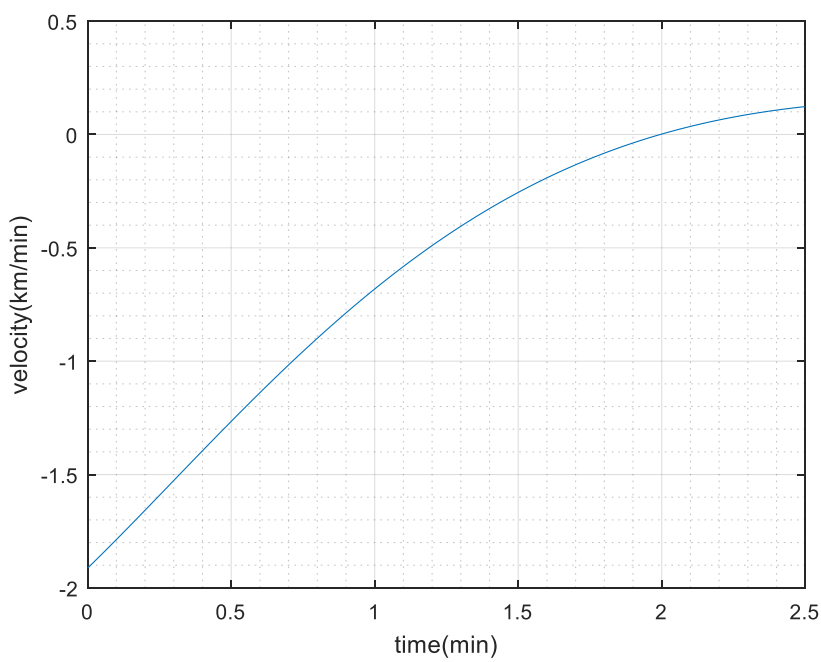
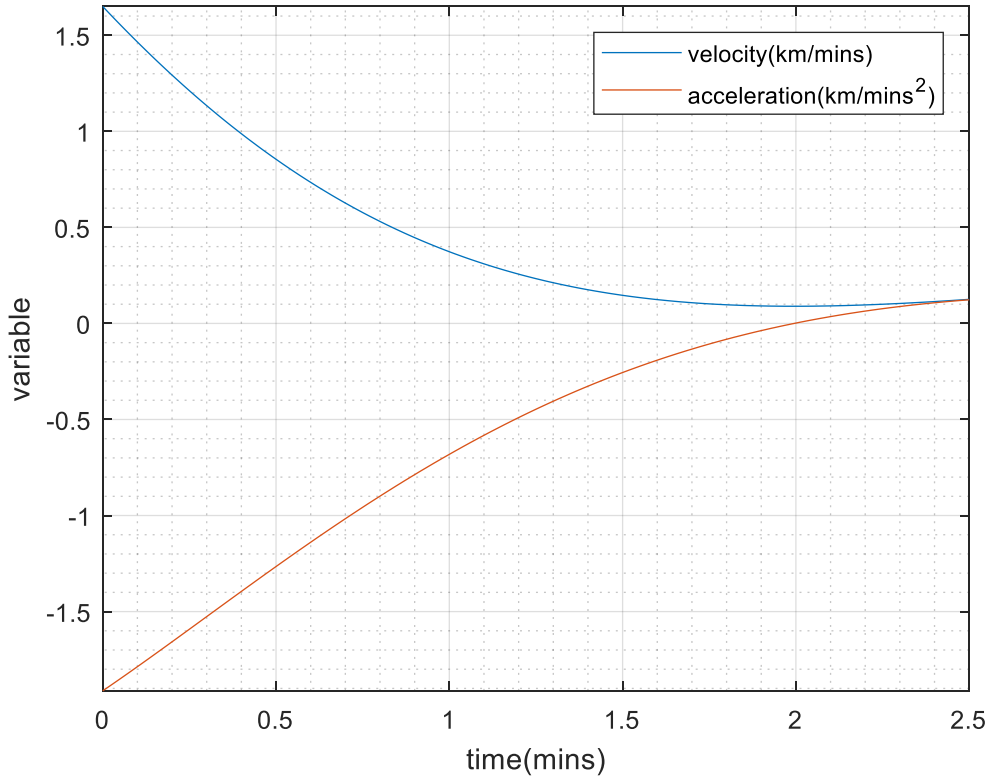


Figure 3



(c)

Input

```
commandwindow
clear
clc
syms x
y=5*(sin(5*x))^5
a=y^2
yint=int(a)
yintd=[y,0,3.142]
zint=yintd*yint
```

Output

```
y =

5*sin(5*x)^5
```

```
a =

25*sin(5*x)^10


yint =

(1575*x)/256 - (525*sin(10*x))/512 + (75*sin(20*x))/256 -
(75*sin(30*x))/1024 + (25*sin(40*x))/2048 - sin(50*x)/1024


yintd =

[ 5*sin(5*x)^5, 0, 1571/500]


zint =

[ 5*sin(5*x)^5*((1575*x)/256 - (525*sin(10*x))/512 +
(75*sin(20*x))/256 - (75*sin(30*x))/1024 + (25*sin(40*x))/2048 -
sin(50*x)/1024), 0, (98973*x)/5120 - (32991*sin(10*x))/10240 +
(4713*sin(20*x))/5120 - (4713*sin(30*x))/20480 +
(1571*sin(40*x))/40960 - (1571*sin(50*x))/512000]

>>
```