DIGITAL ASSIGNMENT – 6

FALL SEMESTER : 2018-19

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Slot: **L5+L6**

Course Name: **CALCULUS FOR ENGINEERS (MATLAB)**

Course Code: **MAT1011**

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Question 1.

Find the work done for the force $F(x,y,z)= yz\,i + xz\,j + (xy+2z)\,k$ along the line segment from (1,0,-2) to (4,6,3).

Solution:

(i

CODE:-

```
clear all
clc
syms x y z t
F=input('Enter i,j & k components of force in vector form: ');
T=input('Enter parametric form of x,y & z as a vector input:');
R=[x y z];
L=input('Enter parametric lower limit:');
U=input('Enter parametric upper limit:');
R1=subs(R,[x y z],[T(1),T(2),T(3)]);
DR1=diff(R1,t);
F1=subs(F,[x y z],[T(1),T(2),T(3)]);
NF=F1.*DR1;
NF1=NF(1)+NF(2)+NF(3)
I=int(NF1,t,L,U)
```

INPUT:

```
Enter i,j & k components of force in vector form: [y.*z x.*z (x.*y+2.*z)]
Enter parametric form of x,y & z as a vector input:[(3.*t+1) 6.*t (5.*t-2)]
Enter parametric lower limit:0
Enter parametric upper limit:1
```

OUTPUT:

```
NF1 =

50*t + 30*t*(3*t + 1) + 18*t*(5*t - 2) + 6*(3*t + 1)*(5*t - 2) - 20


I =

77
```

Question 2.

Find the work done for the force $F(x,y)=x^2i+y^2j$ along the arc of the parabola y =2x^2 from (-1,2) to (2,8).

Solution:

(i) CODE:-

```
clear all
clc
syms x y t
F=input('Enter i & j components of force in vector form: ');
T=input('Enter parametric form of x & y as a vector input:');
R=[x y];
L=input('Enter parametric lower limit:');
U=input('Enter parametric upper limit:');
R1=subs(R,[x y],[T(1),T(2)]);
DR1=diff(R1,t);
F1=subs(F,[x y],[T(1),T(2)]);
NF=F1.*DR1;
NF1=NF(1)+NF(2)
I=int(NF1,t,L,U)
```

INPUT:

```
Enter i & j components of force in vector form: [x.^2 y.^2]
Enter parametric form of x & y as a vector input:[t 2.*t.^2]
Enter parametric lower limit:-1
Enter parametric upper limit:2
```

OUTPUT:

```
NF1 =

16*t^5 + t^2


I =

171
```