Mansoura University	Computer Applications	First Semester
Faculty of Engineering		Date: 31-1-2010
Prod. & Mechanical Design Deptartment		Time: Three Hours
For First Year Prod Dept. Students		Full Mark (60)

Answer all the following questions using the format of Matlab Programming:

Question1: (20 Marks)

For A= [1 2 4 ; -3 -1 4 ; 1 5 8] , B= [4 6 1 ; 2 -1 3 ; 4 -6 9]
and Q= [-1 2 3 -6 8 7 2] Find:

- A(2,1)
- A(3,:)
- X=A'
- Y=Q(1:4)
- Z=Q(3:end)
- R=Q(2:5)
- C=A+B
- D=B-A
- E=A-B
- F=A.*B
- G=B.*A
- P=mean(Q)
- W=mean(A')
- U=size(A)
- H=A*B
- J=B*A
- K=diag(A)
- L=sum(B)
- M=max(A,B)
- N=min(A,B)
- T=max(Q)
- S = [A.*B zeros(3) ; B A*B]
- V = [A ones(3) ; eye(3) A-B]

Question 2: (10 Marks)

Design Matlab programs to draw the following figures:

Figure No. 1

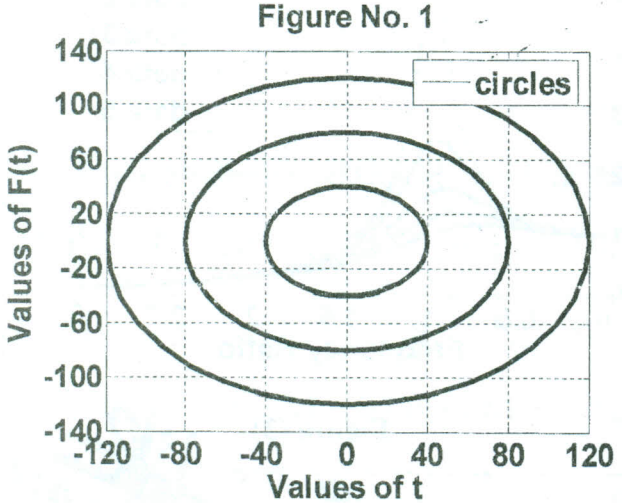
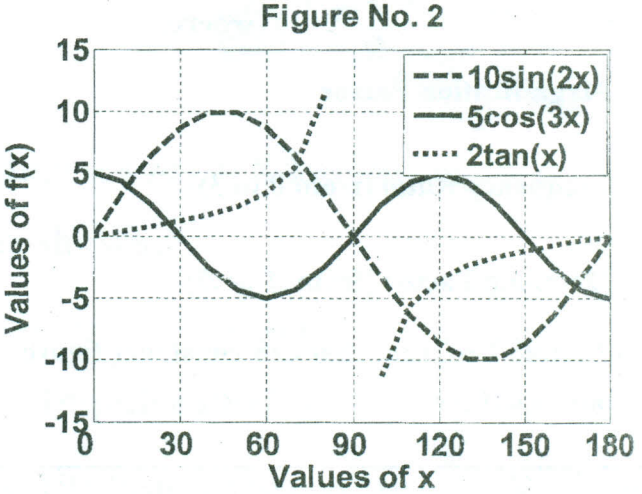


Figure No. 2



Question3: (15 Marks)

What are the outputs of the following 3 Matlab Programs:

a)
```
for i=1:3
    for j=1:3
        z(i,j)=i+j
    end
end
a = min(z) + max(z)
b = mean(z) * abs(z)
c = sum(z) * diag(z')
```

b)
```
syms x
z= int(x*-3*x^3-2)
r=int(z)
q= diff(x*-3*x^3+5*x*-6*x^4)
```

c)
```
a=[-1   3 ; 2   -4];
b=[ a   eye(2) ;   zeros(2)   a- a']
c=[ ones(2)   a.* a' ;   a'   a* a' ]
```

Question4: (5 Marks)

The scores received by 100 students on the midterm exam and the number of students that obtained each score are:

Score	100	90	80	70	60	50	40
No. of Student	5	10	15	25	30	10	5

Using a Matlab program, generate a histogram of these data, and find the average score.

Question5: (10 Marks)

The effect of damping factor on the magnification factor for different frequency ratios is shown in figure (3), and can be given by the following equation:

$$\frac{x}{x_0} = \frac{1}{\sqrt{\left[1-\left(\frac{\omega}{\omega_n}\right)^2\right]+\left(2\xi\frac{\omega}{\omega_n}\right)^2}}$$

where;

$\frac{x}{x_0}$ **Magnification Factor**

$\frac{\omega}{\omega_n}$ **Frequency Ratio (from 0 to 3)**

ξ **Damping Factor (from .1 to .5)**

Write a Matlab Program that can construct figure (3) with all its details.

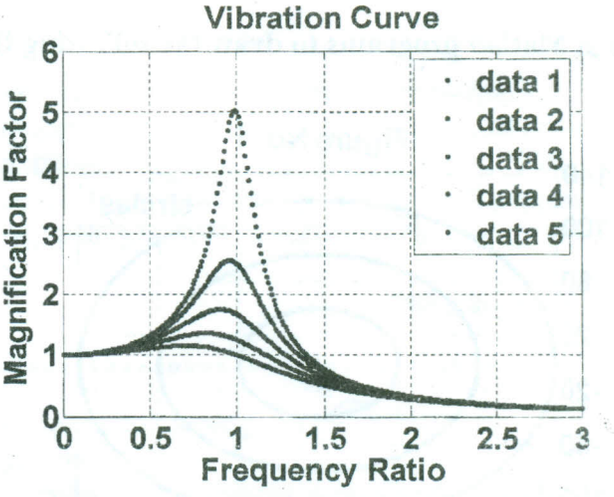


Figure (3)

31/11/2010

Good Luck,

Dr. Ahmed Galal