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Course: CMPE 362

Homework 1 Report

- In problems 3 through 6 we declared scalar, vector, and matrix variables and equations. In all problems we learned to apply some common functions and we plotted more than one functions on the same figure.
- In problems 7 through 10 we did basic plotting again and plotted one than one functions on the same figures.
- Between the seventh and tenth problems we used different random variable forms and generated different variables with different variances.
- In these problems we learnt to generate uniformly distributed random number, Gaussian(Normal) Random variable, Gaussian Random variable and uniformly distributed random variables.
- In all problems we plotted more than one functions on the same figure.
- In the initial parts I have many difficulties to understand but after the some points Matlab shows its itself with its beauties.

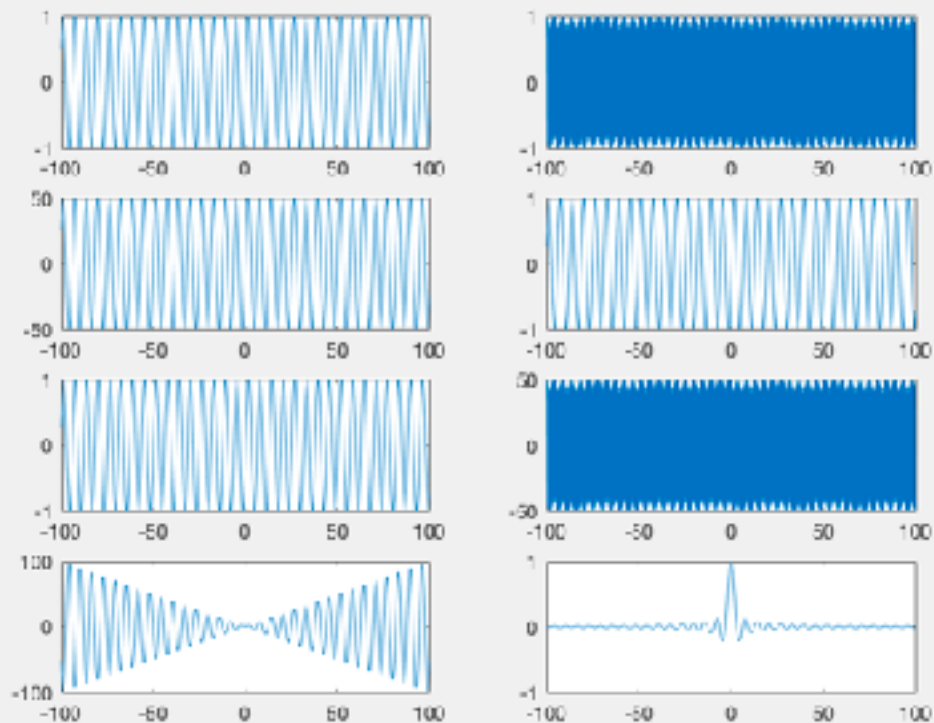
I learned and practiced the basic syntax and operation of MATLAB. It's a powerful and convenient programming language to work with mathematical operations and with tasks based on those mathematical operations. I didn't face much difficulties. Since I didn't use any other programming languages for any specific purposes before I can't make detailed comparisons but I can tell that MATLAB is much more useful when working with mathematical problems but I suppose it would have drawbacks if it were to be used for other purposes like developing games etc.

I have learnt this program in three days and I didn't sleep well at this duration because I didn't had any experience about Matlab and its application this project was too hard for me but I have learnt many things about the Matlab.

THIS IS MY CODE

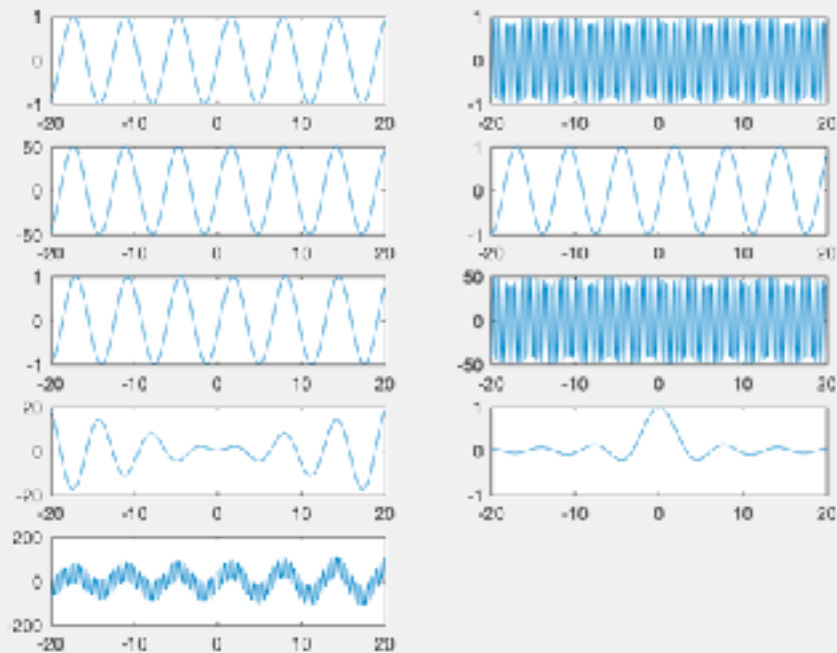
%PROBLEM 3

```
x=linspace(-100,100,2001); %x is vector of real numbers (-100:100)
y1=sin(x);
y2=sin(50*x);
y3=50*sin(x);
y4=sin(x)+50;
y5=sin(x+50);
y6=50*sin(50*x);
y7=x.*sin(x);
y8=sin(x)./x;
figure %made a figure and subplots on it
subplot(4,2,1);
plot(x,y1);
subplot(4,2,2);
plot(x,y2);
subplot(4,2,3);
plot(x,y3);
subplot(4,2,4);
plot(x,y4);
subplot(4,2,5);
plot(x,y5);
subplot(4,2,6);
plot(x,y6);
subplot(4,2,7);
plot(x,y7);
subplot(4,2,8);
plot(x,y8);
```



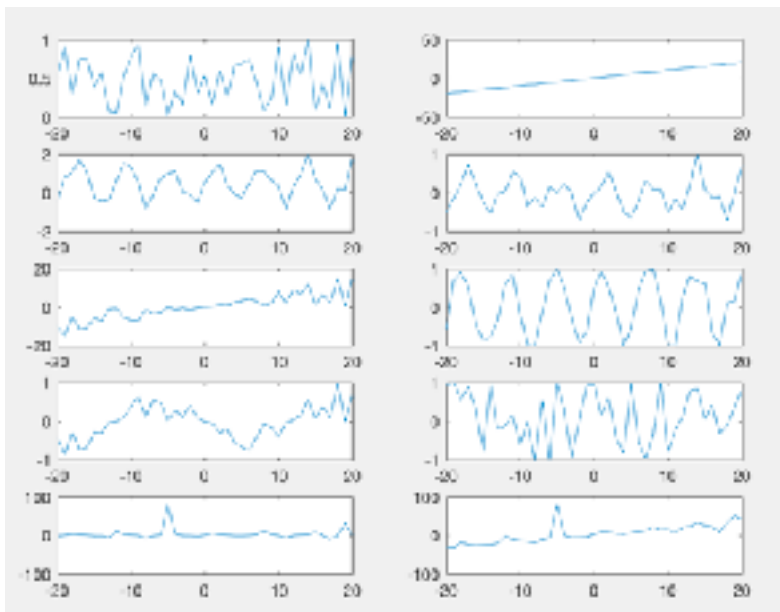
%PROBLEM 4

```
x=linspace(-20,20,401); %Let x is vector of real numbers (-20:20)
y1 = sin(x);
y2=sin(50*x);
y3=50*sin(x);
y4= sin(x+50);
y5= sin(x+50);
y6= 50*sin(50*x);
y7= x.*sin(x);
y8=sin(x)./x;
y9= y1+y2+y3+y4+y5+y6+y7+y8;
figure %made a figure and subplots on it
subplot(5,2,1);
plot(x,y1);
subplot(5,2,2);
plot(x,y2);
subplot(5,2,3);
plot(x,y3);
subplot(5,2,4);
plot(x,y4);
subplot(5,2,5);
plot(x,y5);
subplot(5,2,6);
plot(x,y6);
subplot(5,2,7);
plot(x,y7);
subplot(5,2,8);
plot(x,y8);
subplot(5,2,9);
plot(x,y9);
```



%PROBLEM 5

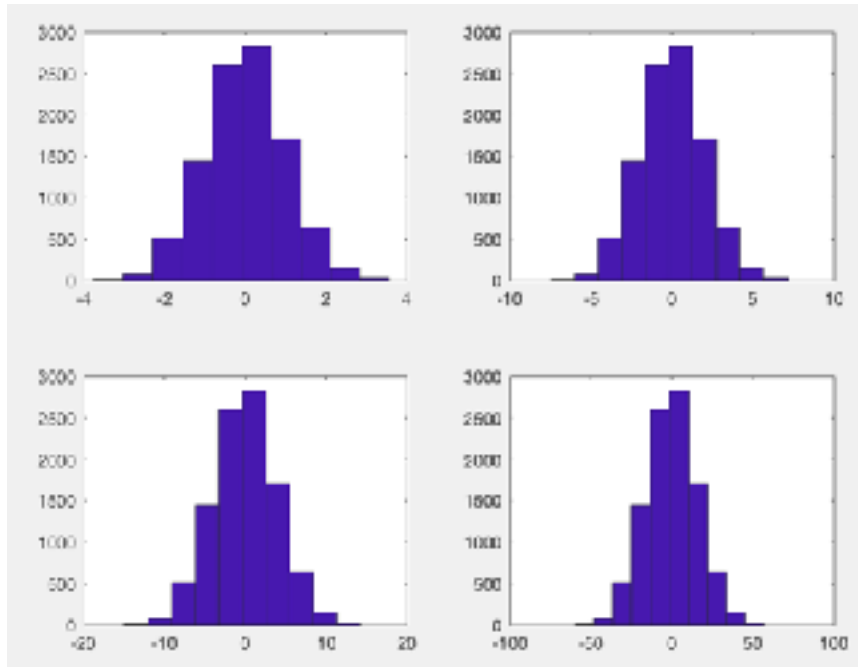
```
x=linspace(-20,20,41); %unit variance Gaussian distributed random number in
(-,)
z=randn([1 41]); %Generate 41
                    %random numbers following Gaussian distributed random
numbers
y10= z;
y11= z+x ;
y12= z.+sin(x);
y13= z.*sin(x);
y14=x.*sin(z);
y15= sin(x.+z);
y16= z.*sin(50*x);
y17=sin(x.+50*z);
y18=sin(x)./z;
y19= y11+y12+y13+y14+y15+y16+y17+y18;
figure %made a figure and subplots on it
subplot(5,2,1);
plot(x,y10)
subplot(5,2,2);
plot(x,y11)
subplot(5,2,3);
plot(x,y12)
subplot(5,2,4);
plot(x,y13)
subplot(5,2,5);
plot(x,y14)
subplot(5,2,6);
plot(x,y15)
subplot(5,2,7);
plot(x,y16)
subplot(5,2,8);
plot(x,y17)
subplot(5,2,9);
plot(x,y18)
subplot(5,2,10);
plot(x,y19)
```



%PROBLEM 6

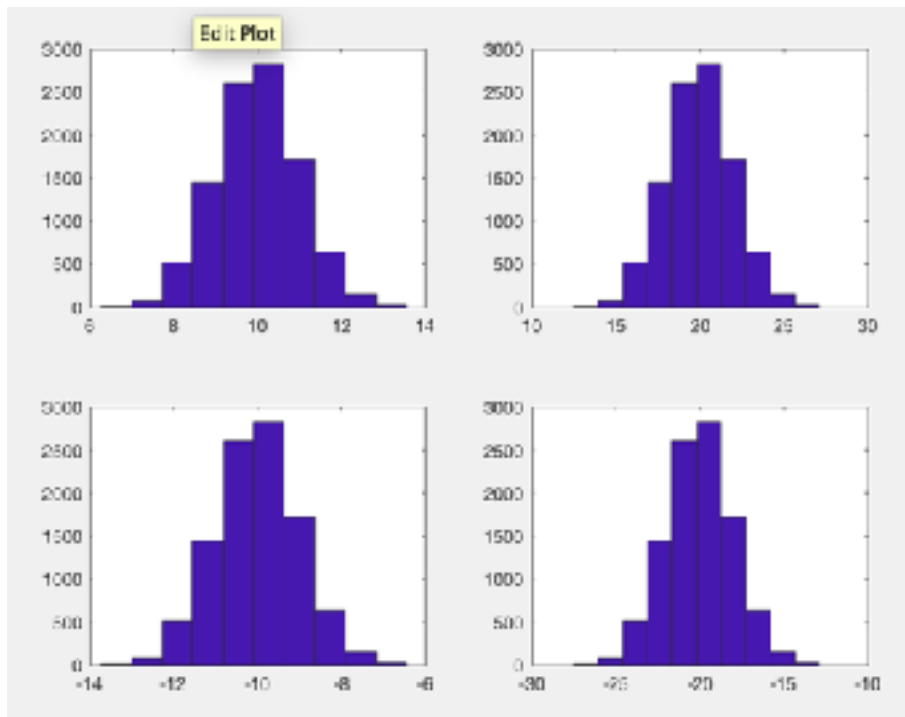
```
z=rand([1 41]); %rand generates uniformly distributed random number in [0,1]
%Generated 41 random numbers following
%uniformly distributed random numbers.
```

```
y20= z;
y21 = z.+x ;
y22= z.+sin(x);
y23= z.*sin(x);
y24=x.*sin(z);
y25= sin(x.+z);
y26= z.*sin(50*x);
y27=sin(x.+50*z);
y28=sin(x)./z;
y29= y21+y22+y23+y24+y25+y26+y27+y28;
figure %made a figure and subplots on it
subplot(5,2,1);plot(x,y20)
subplot(5,2,2);plot(x,y21)
subplot(5,2,3);plot(x,y22)
subplot(5,2,4);plot(x,y23)
subplot(5,2,5);plot(x,y24)
subplot(5,2,6);plot(x,y25)
subplot(5,2,7);plot(x,y26)
subplot(5,2,8);plot(x,y27)
subplot(5,2,9);plot(x,y28)
subplot(5,2,10);plot(x,y29)
```



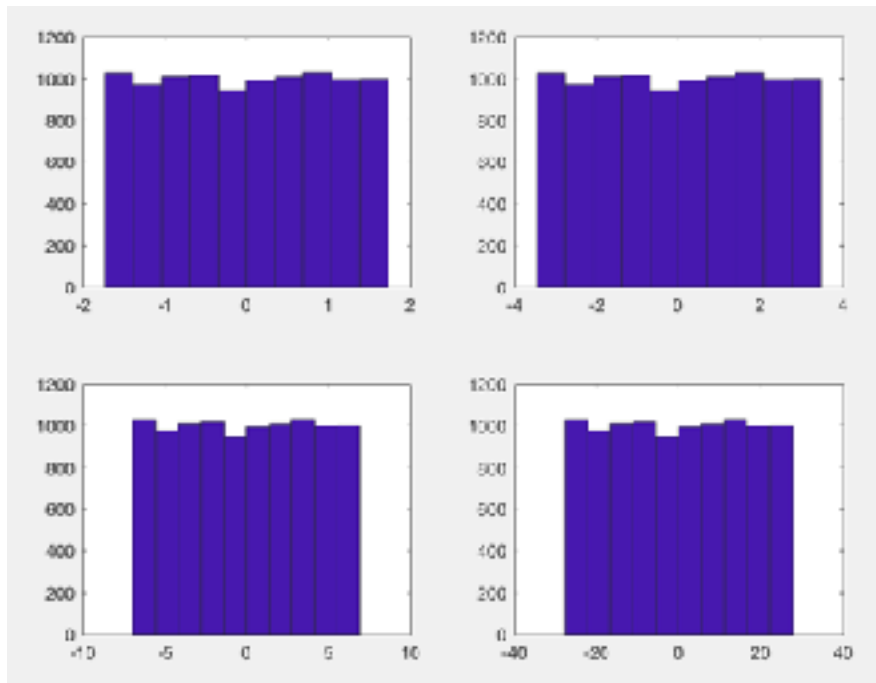
%PROBLEM 7

```
z=randn([1 10000]); %Starting with z (0,1) Gaussian(Normal) Random variable.
%Generate 10000 random variables with mean 0, variance 1,4,16,256
r1=z*1+0;
r2=z*2+0;
r3=z*4+0;
r4=z*16+0;
figure
subplot(2,2,1);hist(r1)
subplot(2,2,2);hist(r2)
subplot(2,2,3);hist(r3)
subplot(2,2,4);hist(r4)
```



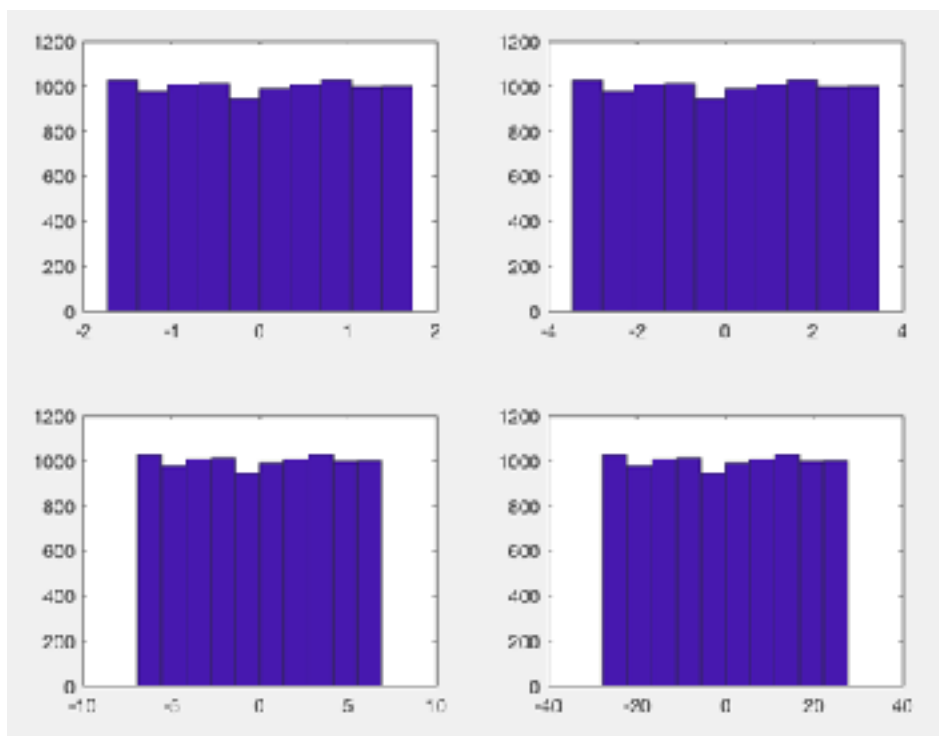
%PROBLEM 8

```
%Starting with z (0,1) Gaussian Random variable
%Generate 10000 random variables with mean 10, variance 1
%Generate 10000 random variables with mean 20, variance 4
%Generate 10000 random variables with mean -10, variance 1
%Generate 10000 random variables with mean -20, variance 4
r6=z*1+10;
r7=z*2+20;
r8=z*1-10;
r9=z*2-20;
figure
subplot(2,2,1);hist(r6)
subplot(2,2,2);hist(r7)
subplot(2,2,3);hist(r8)
subplot(2,2,4);hist(r9)
```



%PROBLEM 9

```
%Starting with z (0,1) uniformly distributed random variable
z=rand([1 10000]);
%Generate 10000 random variables with mean 0, variance 1
%Generate 10000 random variables with mean 0, variance 4
%Generate 10000 random variables with mean 0, variance 16
%Generate 10000 random variables with mean 0, variance 256
r11=(z-1/2)*2*3^(1/2)*1+0;
r21=(z-1/2)*2*3^(1/2)*2+0;
r31=(z-1/2)*2*3^(1/2)*4+0;
r41=(z-1/2)*2*3^(1/2)*16+0;
figure
subplot(2,2,1);hist(r11)
subplot(2,2,2);hist(r21)
subplot(2,2,3);hist(r31)
subplot(2,2,4);hist(r41)
```



%PROBLEM 10

```
%Starting with z (0,1) uniformly distributed random variable
%Generate 10000 random variables with mean 10, variance 1
%Generate 10000 random variables with mean 20, variance 4
%Generate 10000 random variables with mean -10, variance 1
%Generate 10000 random variables with mean -20, variance 4
r61=(z-1/2)*2*3^(1/2)*1+10;
r71=(z-1/2)*2*3^(1/2)*2+20;
r81=(z-1/2)*2*3^(1/2)*1-10;
r91=(z-1/2)*2*3^(1/2)*2-20;
figure
subplot(2,2,1); hist(r61)
subplot(2,2,2); hist(r71)
subplot(2,2,3); hist(r81)
subplot(2,2,4); hist(r91)
```

