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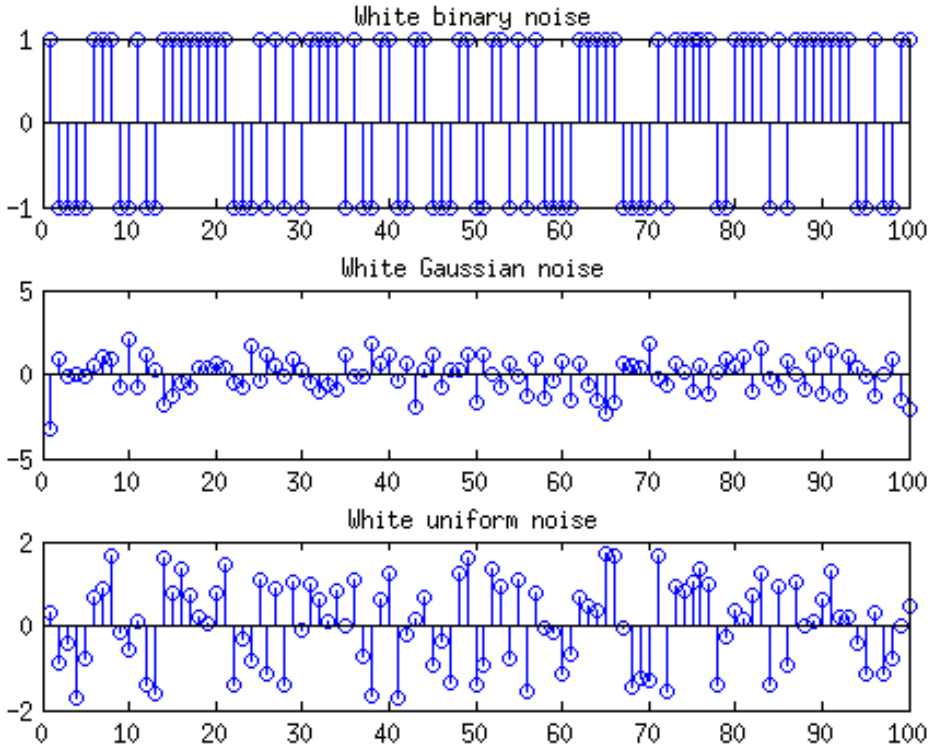
Problem 1

a) The graphs speak for themselves

```
L=100;
x=linspace(1, L, L);

figure(1)

subplot(3,1,1);
b=randi([0 1], 1, L)*2-1;
stem(x, b);
title('White binary noise');

subplot(3,1,2);
g=randn(1, L);
stem(x, g);
title('White Gaussian noise');

subplot(3,1,3);
u=rand(1, L).*b*sqrt(3);
stem(x, u);
title('White uniform noise');
```

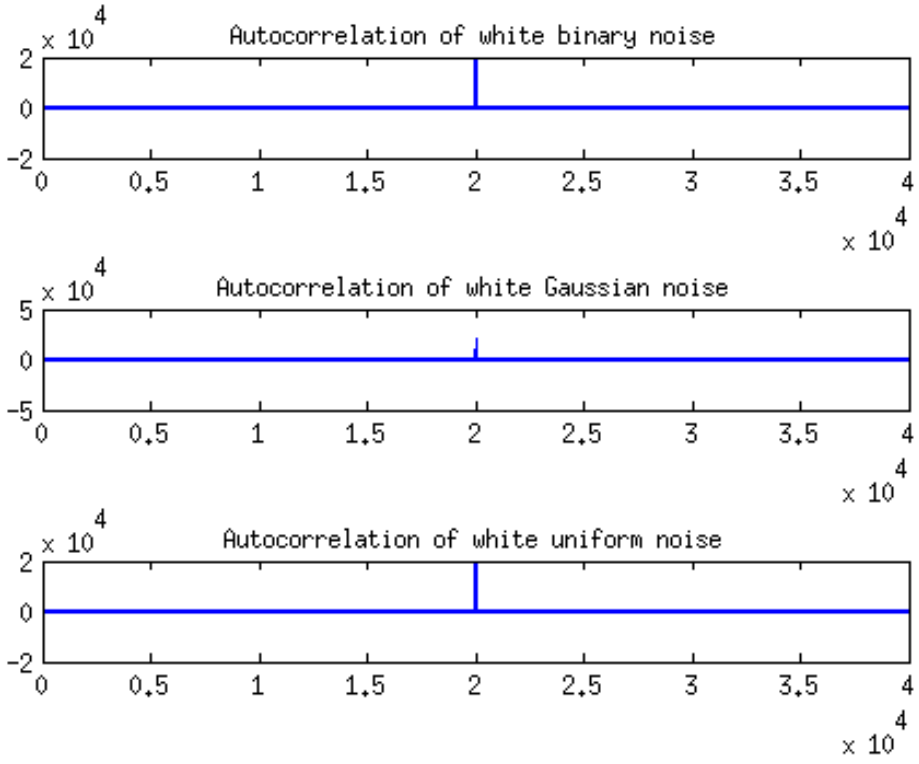


c)

```
N=20000;
b1=randi([0 1], 1, N)*2-1;
g1=randn(1, N);
u1=rand(1, N).*b1*sqrt(3);

mean(b1)
mean(g1)
mean(u1)

% All of the values are less than 0.01, so they are close to the
% theoretical mean of 0

rbxx=xcorr(b1);
rgxx=xcorr(g1);
ruxx=xcorr(u1);

figure(2)

subplot(3,1,1);
plot(rbxx);
title('Autocorrelation of white binary noise');

subplot(3,1,2);
plot(rgxx);
```

```
title('Autocorrelation of white Gaussian noise');

subplot(3,1,3);
plot(ruxx);
title('Autocorrelation of white uniform noise');
```

```
ans =

    0.0069


ans =

   -0.0018


ans =

    0.0050
```

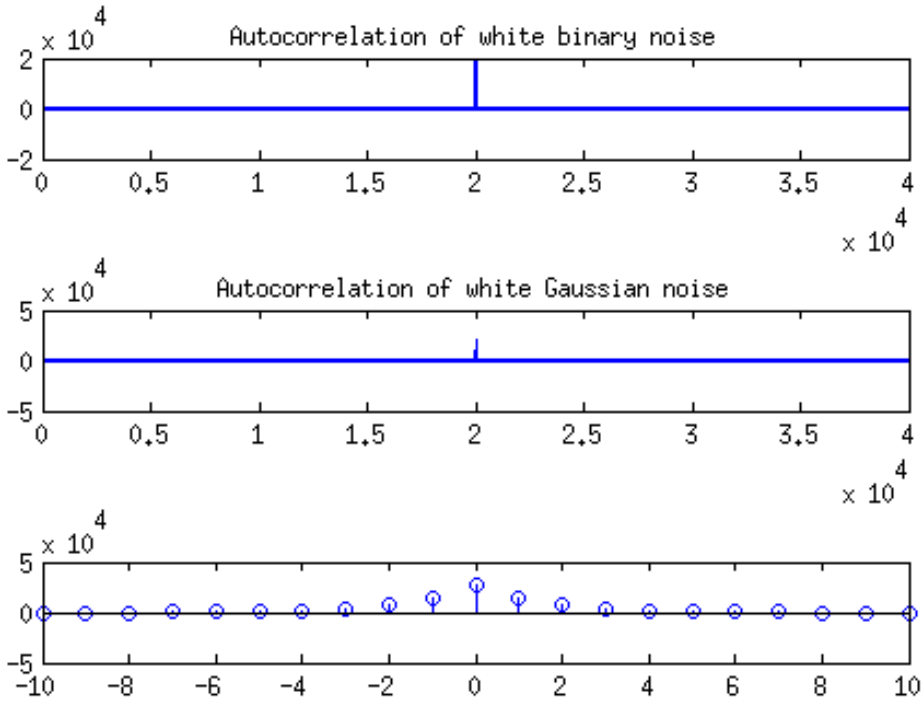


Problem 2

c)

```
N=20000;
n=linspace(-9999,10000,N);
gw=randn(1, N);

h=(-1/2).^n;

x=filter(1, [1 -1/2], gw);
length(x)
mean(x)
%stem(x);
mx=sum(x)/length(x1);
%stem(mx);
rxx=xcorr(x, 10);
stem(-10:10,rxx);
%stem(linspace(-length(rxx)/2, length(rxx)/2-1, length(rxx)), rxx);
```

```
ans =

       20000


ans =

   -0.0263
```



Problem 3

a)

```
K=20;
gw=randn(1, 100);
x=filter(1, [1 -1/2], gw);
```

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