American International University- Bangladesh
Department of Computer Science

Lab Report Cover Sheet

Course Name	Data Communication
Lab Report No.	04
Lecturer Name	**TANJIL AMIN**
Semester	Summer 2020-21
Submission Date	30/06/2020
Section	E
Group No.	

Student Name	Student ID	Contribution (out of 100%)
1. Rahman, Mahibur	18-36904-1	100%
2.		
3.		
4.		
Lecturer Remarks (Only for teacher)		

ID: 18-36904-1

AB-CDEFG-H

A=1, B=8, C=3, D=6, E=9, F=0, G=4, H=1

(A)

A1 = A+B+H=1+8+1=10

A2 = 8+3+1 =12

s= (C+D+H)/30= (3+6+1)/30 = 0.33

(B)

```
close all;
clc;
A1=10;
A2=12;
s=0.33;
fs=50000;
t = 0:1/fs:1-1/fs;
powfund=(A1^2)/2+(A2^2)/2;
varnoise=s^2;
C=3;
D=6;
```
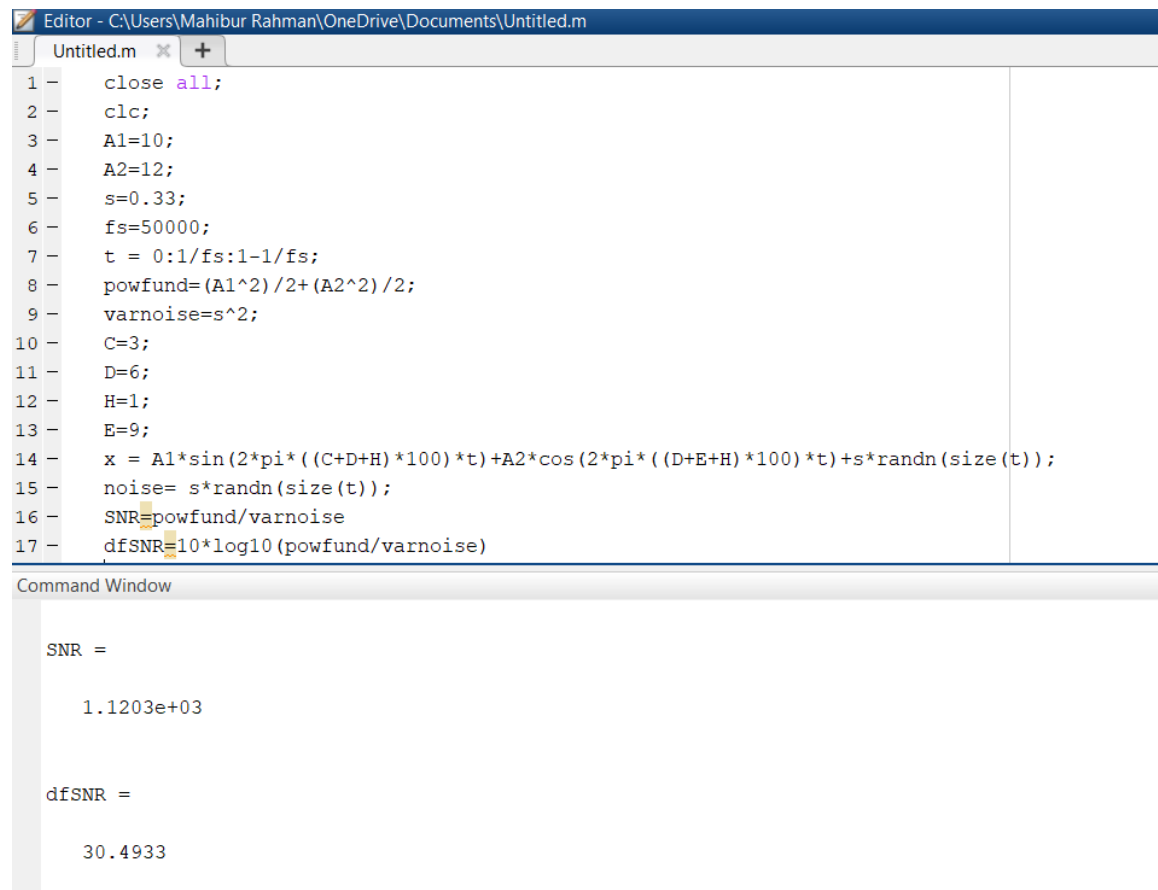
H=1;

E=9;

x = A1*sin(2*pi*((C+D+H)*100)*t)+A2*cos(2*pi*((D+E+H)*100)*t)+s*randn(size(t));

noise= s*randn(size(t));

SNR=powfund/varnoise

dfSNR=10*log10(powfund/varnoise)

```
Editor - C:\Users\Mahibur Rahman\OneDrive\Documents\Untitled.m
Untitled.m  ×  +
 1 -    close all;
 2 -    clc;
 3 -    A1=10;
 4 -    A2=12;
 5 -    s=0.33;
 6 -    fs=50000;
 7 -    t = 0:1/fs:1-1/fs;
 8 -    powfund=(A1^2)/2+(A2^2)/2;
 9 -    varnoise=s^2;
10 -    C=3;
11 -    D=6;
12 -    H=1;
13 -    E=9;
14 -    x = A1*sin(2*pi*((C+D+H)*100)*t)+A2*cos(2*pi*((D+E+H)*100)*t)+s*randn(size(t));
15 -    noise= s*randn(size(t));
16 -    SNR=powfund/varnoise
17 -    dfSNR=10*log10(powfund/varnoise)
```

Command Window

```
SNR =

   1.1203e+03


dfSNR =

   30.4933
```

(C)

close all;

clc;

A1=10;

A2=12;

s=0.33;

```
fs=50000;

t = 0:1/fs:1-1/fs;

powfund=(A1^2)/2+(A2^2)/2;

varnoise=s^2;

C=3;

D=6;

H=1;

E=9;

x = A1*sin(2*pi*((C+D+H)*100)*t)+A2*cos(2*pi*((D+E+H)*100)*t)+s*randn(size(t));

noise= s*randn(size(t))

SNR=powfund/varnoise

dfSNR=10*log10(powfund/varnoise)

bandwidth = 1600-1000

capacity1=bandwidth*log2(1+SNR)

capacity2=bandwidth*log2(1+dfSNR)
```

Command Window

```
SNR =

   1.1203e+03


dfSNR =

   30.4933


bandwidth =

   600


capacity1 =

   6.0786e+03


capacity2 =

   2.9862e+03
```

(D)

close all;

clc;

A1=10;

A2=12;

s=0.33;

fs=50000;

t = 0:1/fs:1-1/fs;

powfund=(A1^2)/2+(A2^2)/2;

varnoise=s^2;

C=3;

D=6;

```
H=1;

E=9;

x = A1*sin(2*pi*((C+D+H)*100)*t)+A2*cos(2*pi*((D+E+H)*100)*t)+s*randn(size(t));

noise= s*randn(size(t));

SNR=powfund/varnoise ;

dfSNR=10*log10(powfund/varnoise);

bandwidth = 1600-1000;

capacity1=bandwidth*log2(1+SNR)

capacity2=bandwidth*log2(1+dfSNR)

apprxDataRate1=floor(bandwidth*log2(1+SNR))

apprxDataRate2=floor(bandwidth*log2(1+dfSNR))

level1=floor(2^(apprxDataRate1/(2*bandwidth)))

level2=floor(2^(apprxDataRate2/(2*bandwidth)))
```

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Untitled.m

```
21 -    apprxDataRate1=floor(bandwidth*log2(1+SNR))
22 -    apprxDataRate2=floor(bandwidth*log2(1+dfSNR))
23 -    level1=floor(2^(apprxDataRate1/(2*bandwidth)))
```

Command Window

```
capacity1 =

   6.0786e+03


capacity2 =

   2.9862e+03


apprxDataRate1 =

        6078


apprxDataRate2 =

        2986


level1 =

    33


level2 =

    5
```