Lost Call

clc;

clear all;

close all;

kk=1;

N=input("Enter N(Number of Trunks: ");

A=input("Enter A: ");

for n=1:N

num=power(A,n)/factorial(n);

deno=0;

for k=0:n

deno=deno+power(A,k)/factorial(k);

end

final(kk)=num/deno;

kk=kk+1;

end

disp(final);

n=1:N

stem(n,final());

xlabel("N");

ylabel("P(x)");

hold on;

plot(n,final);

hold on;

BER AWGN

clc;

close all;

clear all;

bitcount=100000;

SNR=0:1:10;

for k=1:1:length(SNR)

tote=0;

totb=0;

while tote<100

rbits=round(rand(1,bitcount));

N0=1/10^(SNR(k)/10);

tx=-2\*(rbits-0.5);

rx=tx+sqrt(N0/2)\*(randn(1,length(tx)))+i\*(randn(1,length(tx)));

rx2=rx<0;

diff=rbits-rx2;

tote=tote+sum(abs(diff));

totb=totb+length(rbits);

end

BER(k)=tote/totb;

end

semilogy(SNR,BER,'\*r');

hold on;

xlabel('Eb/N0 (dB)');

ylabel('BER');

title('SNR Vs BER when modulation with BPSK in AWGN channel')

thber=0.5\*erfc(sqrt(10.^(SNR/10)));

semilogy(SNR,thber);

grid on;

legend('Simulated curve','Theoritical Curve');

PCM: Speech Encoding-Decoding

clc;

close all;

clear all;

n=input('Enter n for n-bit PCM');

n1=input('Enter number of samples per period');

L=2^n;

x=0:2\*pi/n1:4\*pi;

s=8\*sin(x);

subplot(5,1,1);

plot(s);

title('Analog Signal');

grid on;

xlabel('Time');

ylabel('Amplitude');

subplot(5,1,2);

stem(s);

grid on;

title('Sampled Signal');

xlabel('Time');

ylabel('Amplitude');

vmax=8;

vmin=-vmax;

del=(vmax-vmin)/L;

part=vmin:del:vmax;

code=vmin-(del/2):del:vmax+(del/2);

[ind,q]=quantiz(s,part,code);

l1=length(ind);

l2=length(q);

for i=1:l1

if(ind(i)~=0)

ind(i)=ind(i)-1;

end

i=i+1;

end

for i=1:l2

if(q(i)==vmin-(del/2))

q(i)=vmin+(del/2);

end

end

subplot(5,1,3)

stem(q);

grid on;

title('Quantized Signal');

xlabel('Time');

ylabel('Amplitude');

code=de2bi(ind,'left-msb');

k=1;

for i=1:l1

for j=1:n

coded(k)=code(i,j);

j=j+1;

k=k+1;

end

i=i+1;

end

subplot(5,1,4);

stairs(coded);

axis([0 100 -2 3]);

grid on;

title('Encoded Signal')

xlabel('Time');

ylabel('Amplitude');

qunt=reshape(coded,n,length(coded)/n);

index=bi2de(qunt','left-msb');

q=del\*index+vmin+(del/2);

subplot(5,1,5);

plot(q);

grid on;

title('Decoded Signal');

xlabel('Time');

ylabel('Amplitude');

GMSK

clear all;

close all;

clc;

nrz\_data=[0 1 0.5 1 0 0.5 0.5]; %sample code

Tb=1; %bit duration

BT=0.3; %BT product of filter

sps=32;

Ts=Tb/sps; %sample period

t=0.5;

Tb=(-2\*Tb:Ts:2\*Tb);

alpha=2\*pi\*BT/(sqrt(log(2)))

gauss=(alpha\*(2\*t-0.5))-(alpha\*(2\*t+0.5));

K=pi/2;

gauss=K\*gauss;

nrz=upsample(nrz\_data,sps);

nrz\_gauss=conv(gauss,nrz);

subplot(3,1,1);

stem(nrz\_data);

title('sample input data');

xlabel('time');

ylabel('amp');

subplot(3,1,2);

plot(nrz\_gauss);

title('gmsk output');

xlabel('time');

ylabel('amp');

MSK = [];

x = [];

for i=1:1000

f = i/100; % f is frequency normalized to to 1/(bit duration)

x = [x, f ];

ymsk = 16/(pi^2) \* (cos(6.2832 \* f))^2/ (1- 16 \* f^2)^2;

MSK = [MSK, 10 \* log10(ymsk)];

end

subplot(3,1,3);

plot(x,MSK, 'r-');

axis([0 10 -60 10]);

title('GMSK PSD');

ylabel('Spectral Power Level in dB');

xlabel('Frequency Offset / Bit Rate');

HATA

clc;

close all;

clear all;

d=1:0.01:20;

hm=5;

hb1=30;

hb2=100;

hb3=200;

fc=1000;

abh=3.2\*(log10(11.75\*hm)).^2-4.97;

L50urban1=69.55+26.16\*(log10(fc))+(44.9-6.55\*log10(hb1))\*log10(d)-13.82\*log10(hb1)-abh;

L50urban2=69.55+26.16\*(log10(fc))+(44.9-6.55\*log10(hb2))\*log10(d)-13.82\*log10(hb2)-abh;

L50urban3=69.55+26.16\*(log10(fc))+(44.9-6.55\*log10(hb3))\*log10(d)-13.82\*log10(hb3)-abh;

L50suburban1=L50urban1-2\*(log10(fc/28)).^2-5.4;

L50suburban2=L50urban2-2\*(log10(fc/28)).^2-5.4;

L50suburban3=L50urban3-2\*(log10(fc/28)).^2-5.4;

L50rural1=L50urban1-4.78\*(log10(fc)).^2+18.33\*(log10(fc))-40.94;

L50rural2=L50urban2-4.78\*(log10(fc)).^2+18.33\*(log10(fc))-40.94;

L50rural3=L50urban3-4.78\*(log10(fc)).^2+18.33\*(log10(fc))-40.94;

figure(1);

plot(d,L50urban1,'-r',d,L50urban2,'--r',d,L50urban3,':r');

hold on;

legend('hb1=30','hb2=100','hb3=200');

title('Urban');

grid on;

xlabel('d(km)');

ylabel('L(dB)');

figure(2);

plot(d,L50suburban1,'-g',d,L50suburban2,'--g',d,L50suburban3,':g');

hold on;

legend('hb1=30','hb2=100','hb3=200');

title('Suburban');

grid on;

xlabel('d(km)');

ylabel('L(dB)');

figure(3);

plot(d,L50urban1,'-r',d,L50urban2,'--r',d,L50urban3,':r');

hold on;

legend('hb1=30','hb2=100','hb3=200');

title('Rural');

grid on;

xlabel('d(km)');

ylabel('L(dB)');