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FILE LABELS AND ANNOTATIONS

Files ⋮ | MC_Pract4.m × + | Figure 1 × +

Name ▲ | /MATLAB Drive/MC_Pract4.m

pract.
Practi
practi
pratik
RMTF
RMTF
RMTF
RMTF
untitle

```
1    clear;
2    N = 10^6; % number of bits or symbols
3    rand('state',100); % initializing the rand() functi
4    randn('state',200); % initializing the randn() func
5    % Transmitter
6    ip = rand(1,N)>0.5; % generating 0,1 with equal pro
7    s = 2*ip-1; % BPSK modulation 0 -> -1; 1 -> 1
8    n = 1/sqrt(2)*[randn(1,N) + 1i*randn(1,N)]; % white
9    Eb_N0_dB = [-3:10]; % multiple Eb/N0 values
10   nErr = zeros(1,length(Eb_N0_dB)); % Initializing th
11   for ii = 1:length(Eb_N0_dB)
12       % Noise addition
13       y = s + 10^(-Eb_N0_dB(ii)/20)*n; % additive whi
14       % receiver - hard decision decoding
15       ipHat = real(y)>0;
16       % counting the errors
17       nErr(ii) = sum(ip ~= ipHat);
18   end
19   simBer = nErr/N; % simulated ber
20   theoryBer = 0.5*erfc(sqrt(10.^(Eb_N0_dB/10)));
21   % theoretical ber
22   % plot
```

Work...

Name

Eb_N0_...
N
ii
☑ ip
☑ ipHat
n
nErr
s
simBer
theoryBer

Command Window ⋮

>> MC_Pract4
>>

⬚

Bit error probability curve for BPSK modulation

```matlab
clear;

N = 10^6; % number of bits or symbols

rand('state',100); % initializing the rand() function

randn('state',200); % initializing the randn() function

% Transmitter

ip = rand(1,N)>0.5; % generating 0,1 with equal probability

s = 2*ip-1; % BPSK modulation 0 -> -1; 1 -> 1

n = 1/sqrt(2)*[randn(1,N) + 1i*randn(1,N)]; % white gaussian noise, 0dB variance

Eb_N0_dB = [-3:10]; % multiple Eb/N0 values

nErr = zeros(1,length(Eb_N0_dB)); % Initializing the error count vector

for ii = 1:length(Eb_N0_dB)

    % Noise addition

    y = s + 10^(-Eb_N0_dB(ii)/20)*n; % additive white gaussian noise

    % receiver - hard decision decoding

    ipHat = real(y)>0;

    % counting the errors

    nErr(ii) = sum(ip ~= ipHat);

end

simBer = nErr/N; % simulated ber

theoryBer = 0.5*erfc(sqrt(10.^(Eb_N0_dB/10)));

% theoretical ber plot

figure;

semilogy(Eb_N0_dB,theoryBer,'b.-');

hold on;

semilogy(Eb_N0_dB,simBer,'mx-');

axis([-3 10 10^-5 0.5]);

grid on;

legend('Theory', 'Simulation');

xlabel('Eb/No, dB');

ylabel('Bit Error Rate');

title('Bit error probability curve for BPSK modulation');
```