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bitseq = randi([0,1],1000,1);
fc = 2000; % cut-off frequency
NRZ=bitseq(1:100); %Taking first 100 bits
NRZZ=NRZ-0.5;
NRZZ=2*NRZZ;
NRZZ=repelem(NRZZ,100);
f1 = 1500; %passband frequency
f2 = 2000; %cutoff frequency
delf = f2-f1; %transition bandwidth
Fs = 19200; %sampling frequency
dB = 65; %stopband attenuation
N = dB*Fs/(22*delf);
f = (f1)/(Fs/2);

lpf = fir1(round(N)-1, f,'low'); %1st order low pass filter
freqz(lpf,1);
filteredSignal = filter(lpf, 1,NRZZ);

% Adding AWGN noise
snr_dB = 15; % Signal-to-noise ratio in dB
snr = 10^(snr_dB/10); % Convert from dB to linear scale
np = 1/snr; % Calculate noise power(np)
noise = sqrt(np/2)*randn(size(filteredSignal)); % Generate noise samples
ns = filteredSignal + noise; % Add noise to the filtered signal
%ns=noise signal

%This is for plotting eye diagram
figure;
time = 0:1/(fc*100):2/fc-1/(fc*100);
for i = 500:200:length(ns)-149
plot(time,ns(i:i+199)),
title('Eye Pattern for NRZ Pulse'),
xlabel('Time'),
ylabel('Amplitude');
hold on
end
```