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%%%%%%%%%%%%%%BPSK
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function [output_bpsk] = BPSK(input_bpsk,sigma2)
% The function accepts the input sequence ( input_bpsk ) and the
% variance of additive noise ( sigma2 ) and returns the output
% sequence ( output_bpsk ) in the form of voltages with the added noise.
% The voltage of a bit is set to s = 1 V;
s = 1;
output_bpsk = zeros(1,length(input_bpsk));
sigma = sqrt(sigma2);
% The below given for loop does the work of generating output sequence
% of the by taking s and -s corresponding to 0 and 1, and adding random
% noise n to the output sequence using randn function.
for index = 1:length(input_bpsk)
    Xtx = input_bpsk(index);
    if Xtx == 1
        s_tx = s;
    else
        s_tx = -s;
    end
    % Here sigma is multiplied to randn because the variance of the
    % randn generated by MATLAB is 0. Hence in order to get some
    % variance randn is multiplied with sigma.
    n = sigma*randn;
    r = s_tx + n;
    output_bpsk(index) = r;
end
end

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