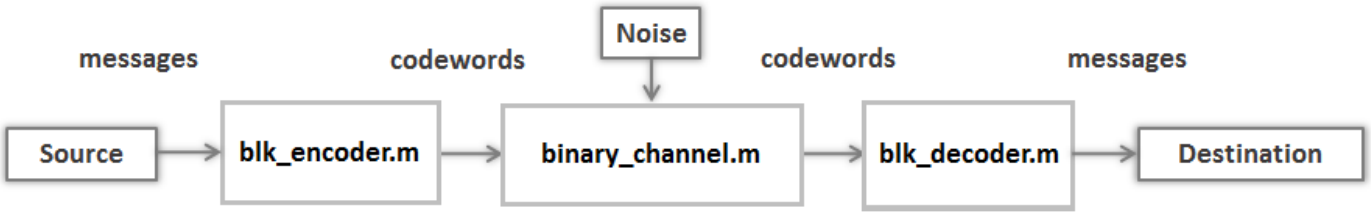
LAB 10 TASK 3 - ERROR CORRECTION CAPABILITY

In this task, you will investigate the error correction capability of the (3,1,3) repetition code and (8, 4, 3) block code, by comparing their BER performance with that of a communication system without using any coding scheme.

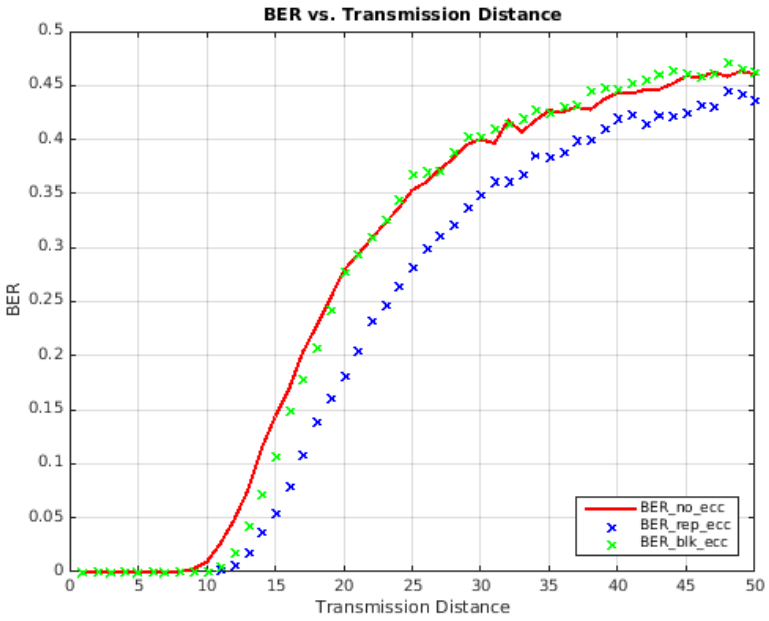



```
num_bits=12800;
bs_raw = rand(1,num_bits)>0.5;    % generate a random bit sequence
distance_list = [1:50];           % list of transmission distances
num_dist = length(distance_list);
BER_no_ecc = zeros(1,num_dist);   % initialize storage arrays
BER_rep_ecc = zeros(1,num_dist);
BER_blk_ecc = zeros(1,num_dist);

rep = 3; % number of repetition
bs_rep_enc = rep_encode_bs(bs_raw,rep);   % (3,1,3) repetition code encoder
bs_blk_enc = blk_encode_bs(bs_raw);       % (8,4,3) block code encoder

% loop over different transmission distances
for i = 1:num_dist,
    distance = distance_list(i);
```

Unanswered

Figure 1

Help



Run Code

Check

INSTRUCTIONS

Step 1: Run the code as presented

After you click on the **Run Code** button, the code will generate a figure with three curves representing the BER performance of three transmission schemes, namely, without error correction code, with the repetition code, and with the (8, 4, 3) parity bit code, respectively.

Step 2: Change the repeating time for repetition code

Try adjusting the number of repetitions used in the repetition code by changing the value of the variable **rep** to 5 and 7, and observe the resulting **BER**.

Step 3: Answer the questions

You do not need to submit your work for this task. Based on your observations and what you have learned in the lectures, **answer the questions below** for credit.

LAB 10 TASK 3 - QUESTION 1 (1 point possible)

At the transmission distance 15, what is the ranking of the error correcting schemes (no error correction coding, (3,1,3) repetition code, (8,4,3) parity bit code) from lowest BER to the highest?

Please select the correct answer.

- no ecc, (8,4,3), (3,1,3)
- (8,4,3), no ecc, (3,1,3)
- (3,1,3), (8,4,3), no ecc
- (8,4,3), (3,1,3), no ecc

Help

Check Save *You have used 0 of 2 submissions*

LAB 10 TASK 3 - QUESTION 2 (1 point possible)

What is the ranking of the three error correcting coding schemes in terms of net bit rate from highest to lowest? Assume that the number of samples per bit and the sampling frequency used for transmission are the same for all schemes.

Please select the correct answer.

- no ecc, (8,4,3), (3,1,3)
- (8,4,3), no ecc, (3,1,3)
- (3,1,3), (8,4,3), no ecc
- (8,4,3), (3,1,3), no ecc

Check Save *You have used 0 of 2 submissions*

LAB 10 TASK 3 - QUESTION 3 (1 point possible)

Which one of the following statments about the (3,1,3) and (5,1,5) repetition coding schemes is correct?

Please select the correct answer.

- At the same transmision distance, the (3,1,3) code has a higher BER, and a higher code rate.
- At the same transmision distance, the (3,1,3) code has a lower BER, but a higher code rate.
- At the same transmision distance, the (3,1,3) code has a higher BER, but a lower code rate.
- At the same transmision distance, the (3,1,3) code has a lower BER, and a lower code rate.

Check Save *You have used 0 of 2 submissions*

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