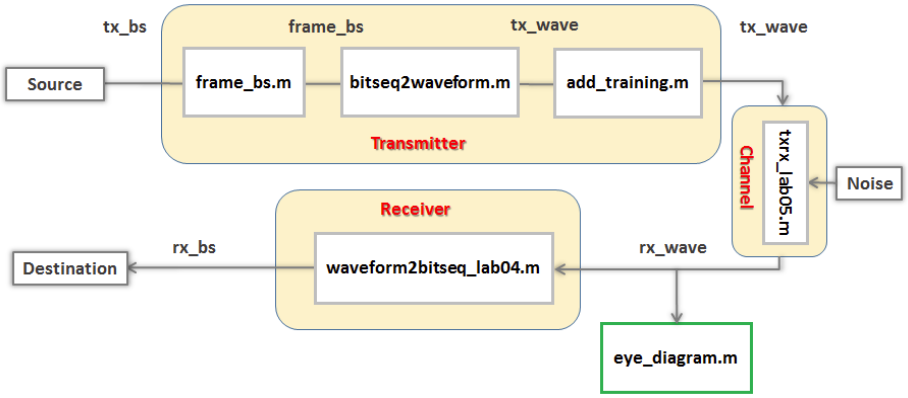
LAB 5 TASK 2 - EFFECT OF BIT TIME ON EYE DIAGRAM (1 point possible)

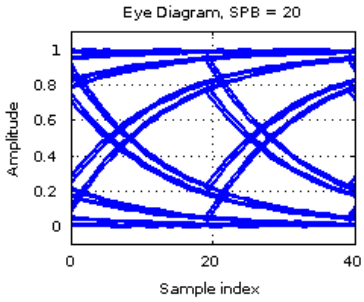
In this task, you will investigate the effect of the bit time on the BER performance of a communication system by generating eye diagrams and observing the BER performance with different bit times.




```
tx_bs=rand(1,1280)>0.5;      % generate a random bit sequence

% Modify the code below so that instead of generating one eye diagram, it
% generates four eye diagrams with SPBs 20, 12, 5 and 1.
% Each eye diagram should be plotted in a separate subwindow as follows
%     SPB=20    SPB=12
%     SPB=5     SPB=1

SPB=20;  % bit time in samples

% transmit/receive bit sequence and compute BER
tx_wave = format_bitseq(tx_bs,SPB);  % create waveform following protocol
rx_wave=txrx_lab05(tx_wave);         % simulate channel
start_ind=find_start(rx_wave);       % find start bit
rx_bs = waveform2bitseq_lab04(rx_wave,SPB);  % decode received waveform
```

Unanswered

Figure 1



Help

The BER for SPB 20 is 0.

Run Code

Check Save *You have used 0 of 10 submissions*

INSTRUCTIONS

Step 1: Run the code as presented

The code in the above window is similar to that of Task 1. In Task 1, you wrote the function **eye_diagram.m**. Now it is provided for you to generate the eye-diagrams. After you click on the **Run Code** button, a window will appear with an eye diagram generated for a bit time of 20 samples in the upper left corner. Text also appears below the figure indicating the bit error rate (BER) computed by comparing the transmitted and received bit sequences. In this case, it should be zero.

The eye diagram was placed in the upper left corner using the **subplot(2,2,1)** command. The command **subplot(m,n,p)** or **subplot(mnp)**, breaks the Figure window into an **m**-by-**n** matrix of small axes and selects the **p**-th axes for the current plot. The axes are counted along the top row of the Figure window, then the second row, etc. For example, for **subplot(2,2,p)** the plot will appear in the upper left for **p**=1, the upper right for **p**=2, the lower left for **p**=3. and the lower right for **p**=4.

Step 2: Plot the eye diagram and compute the BER at different bit times

Your task here is to modify the code to:

1. Plot four eye diagrams, all generated using the same transmitted bit sequence **tx_bs**, but with different bit times: 20 samples, 12 samples, 5 samples and 1 sample.

2. Each eye diagram should appear in a separate subplot within a single figure window (Figure 1). Use a 2 by 2 array of subplots and arrange the plots so that the eye diagram for a bit time of 20 samples appears in the upper left, 12 samples in the upper right, 5 samples in the lower left and 1 sample in the lower right.

3. For each bit time, compute the BER values using the function **compute_BER**, and display it as text.

Hint: One way to do this is to replicate the given code three times: once for each additional subplot. However, you should be able to save time and avoid errors by using a **for** *loop.*

Step 3: Submit your work

Help

Once you have completed your work, click on the **Check** button to submit your answer.