

[Courseware \(/courses/HKUSTx/ELEC1200.1x/3T2014/courseware/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/courseware/)

[Course Info \(/courses/HKUSTx/ELEC1200.1x/3T2014/info/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/info/)

[Course Outline \(/courses/HKUSTx/ELEC1200.1x/3T2014/05fb01b36df14eb99ab54545dabc47f6/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/05fb01b36df14eb99ab54545dabc47f6/)

[Grading Scheme \(/courses/HKUSTx/ELEC1200.1x/3T2014/6e2be4dac3e44b4d9f812e7b5a5d5a29/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/6e2be4dac3e44b4d9f812e7b5a5d5a29/)

[Instructors \(/courses/HKUSTx/ELEC1200.1x/3T2014/674fdd6887fe4f4bb73b984df4a5675b/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/674fdd6887fe4f4bb73b984df4a5675b/)

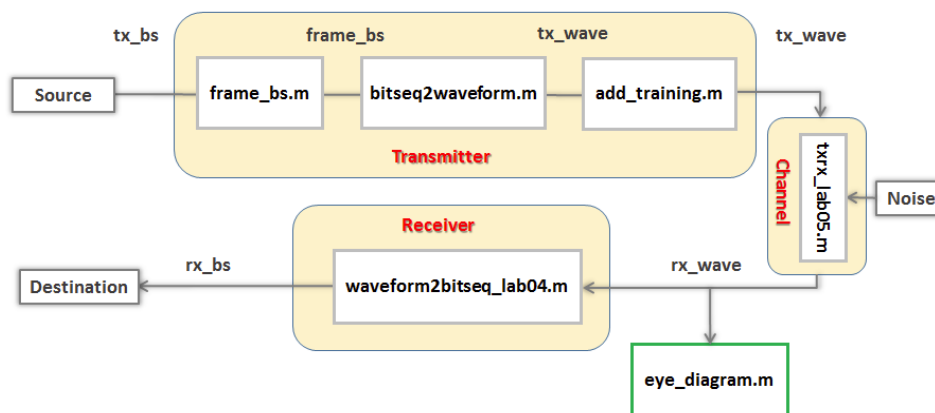
[Resources \(/courses/HKUSTx/ELEC1200.1x/3T2014/a6a8267fef364cccbccd0128d091f11c/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/a6a8267fef364cccbccd0128d091f11c/)

[Discussion \(/courses/HKUSTx/ELEC1200.1x/3T2014/discussion/forum/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/discussion/forum/)

[Progress \(/courses/HKUSTx/ELEC1200.1x/3T2014/progress/\)](/courses/HKUSTx/ELEC1200.1x/3T2014/progress/)

LAB 5 TASK 1 - GENERATE EYE DIAGRAM (1 point possible)

In this task, you will write code implementing the MATLAB function, **eye_diagram.m**, which is highlighted in green below. This function generates the eye diagram of the received waveform to visualize inter-symbol interference (ISI).



```

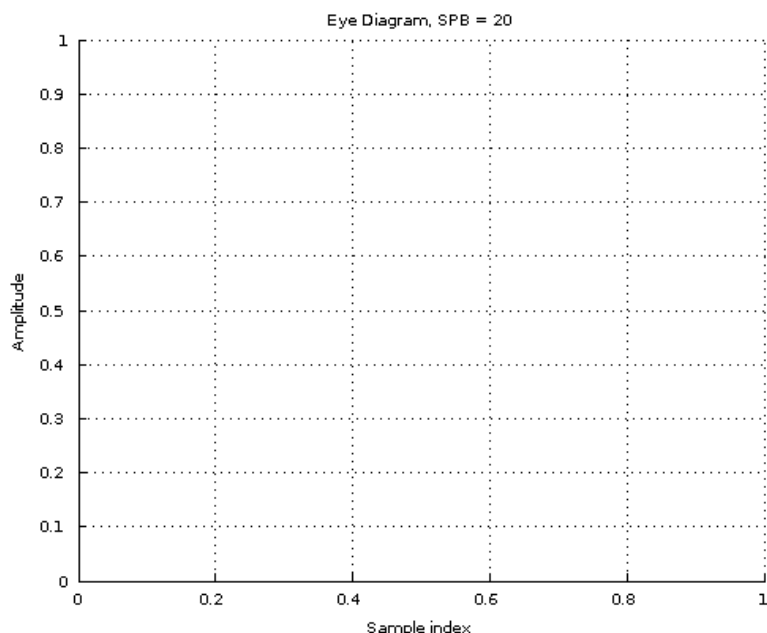
1 tx_bs=rand(1,1280)>0.5;      % generate a random bit sequence
2 SPB=20;                      % bit time in samples
3
4 % transmitter %
5 tx_wave = format_bitseq(tx_bs,SPB); % create waveform following protocol
6 % channel %
7 rx_wave=txrx_lab05(tx_wave);   % simulate channel
8 % receiver %
9 start_ind=find_start(rx_wave); % find start bit
10
11 figure(1);
12 % Place your code below that
13 %   1. Creates the eye diagram of rx_wave, plotting "2*SPB+1" samples in each trace.
14 %   Hint: use for loop.
15 %   2. To superimpose all the traces on the same plot.
  
```

Unanswered

Figure 1

1 of 3

10/10/2014 11:24 AM



Run Code

Check

Save

You have used 0 of 10 submissions

INSTRUCTIONS

Let's first look at how the code works. The first two code lines define a random 1280-bit sequence and the bit time of 20 samples per bit. The function **format_bitseq**, which you have written, encapsulates the bit sequence into a frame and adds the training sequence. The resulting waveform is transmitted over the channel simulated by function **txrx_lab05**. On the receiver side, the function **find_start** returns the index of the first sample of the start bit.

Step 1: Run the code as presented

After you click on the **Run Code** button to run the MATLAB code as presented, you will see an empty figure labelled with the title "Eye Diagram, SPB = 20". Your task is to write code that fills the figure with the eye diagram of the received waveform **rx_wave**.

Step 2: Plot the eye diagram of received waveform

To complete this task, you should add code under the comments starting with

% Place your code below that

This code should create the eye diagram of **rx_wave** that satisfies the following criteria.

1. The eye diagram contains 640 overlapping traces showing segments of $2 \cdot \text{SPB} + 1$ samples from **rx_wave**.
2. The first segment should start from the index **start_ind**.

4. Each trace should be plotted versus indices running from 0 to $2 \times \text{SPB}$.

*Hint: to superimpose all the traces on the same plot, you can use command **hold on**. For more details, see the video Multiple Plots (/courses/HKUSTx/ELEC1200.1x/3T2014/jump_to_id/323f8adb3bf94250b0de9e45b5fc73a3).*

Help

Examine the eye diagram that is generated. Find the height and width of the eye from the diagram. Does the eye appear "open" to you?

Step 3: Submit your work

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



About (<https://www.edx.org/about-us>) Jobs (<https://www.edx.org/jobs>)
Press (<https://www.edx.org/press>) FAQ (<https://www.edx.org/student-faq>)
Contact (<https://www.edx.org/contact>)



EdX is a non-profit created by founding partners Harvard and MIT whose mission is to bring the best of higher education to students of all ages anywhere in the world, wherever there is Internet access. EdX's free online MOOCs are interactive and subjects include computer science, public health, and artificial intelligence.



(<http://www.meetup.com/edX-Global-Community>)



(<http://www.facebook.com/EdxOnline>)



(<https://twitter.com/edXOnline>)



(<https://plus.google.com/+edXOnline>)



(<http://youtube.com/user/edxonline>)

© 2014 edX, some rights reserved.

Terms of Service and Honor Code -
Privacy Policy (<https://www.edx.org/edx-privacy-policy>)