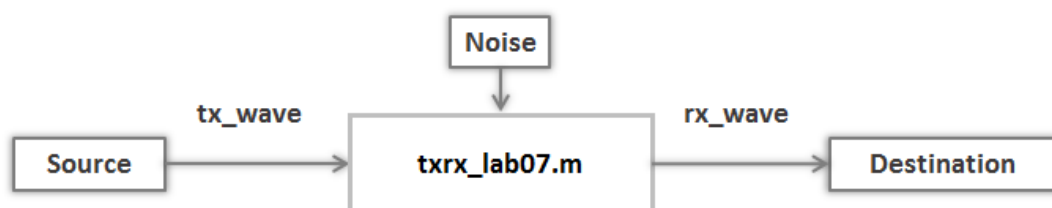


Help

LAB 7 TASK 3 - DISTRIBUTION OF THE RECEIVED SIGNAL (1/1 point)

In this task, you will visualize the distribution of the received signal when transmitting bits "1" and "0", respectively.



```

1 SPB = 50; % bit time in samples
2 distance = 8; % transmission distance
3 tx_bs = [1:1280] > 640; % generate bit sequence of 640 0's and 640 1's
4 tx_wave = format_bitseq(tx_bs,SPB); % create waveform following protocol
5
6 % transmit and receive over noisy channel
7 [rx_wave,start_ind,rx_min,rx_max,sigma] = txrx_lab07(tx_wave,distance);
8 sample_ind = start_ind + 2*SPB-1 + SPB*[0:1279]; % choose subsampling points
9 signal_samples = rx_wave(sample_ind); % extract samples
10
11 xhist = 0.1:0.01:0.7; % centers of histogram bins
12 % Do not modify code above this line
13
14 subplot(2,1,1)
15 % Place your code below that plots the empirical histogram of the

```

Correct

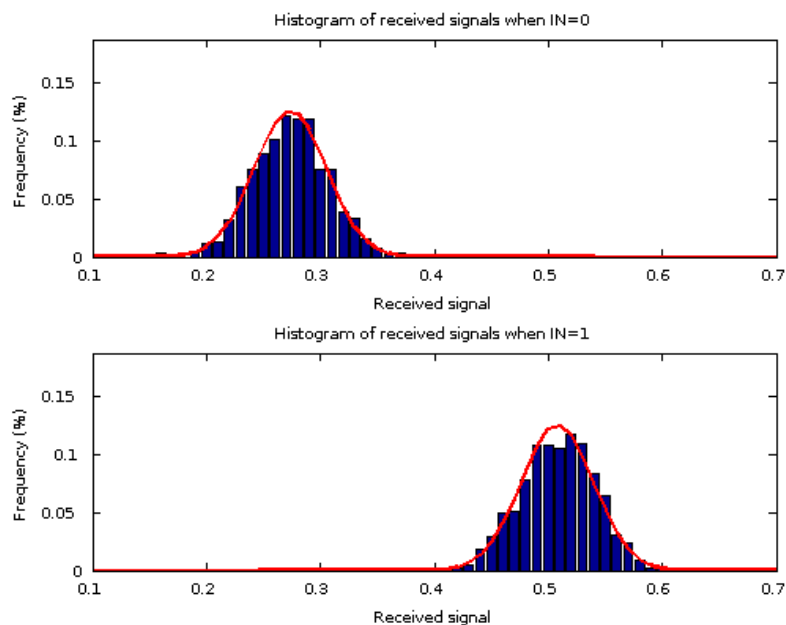
```

subplot(2,1,1)
h = hist(signal_samples(1:640),xhist)/640; % generate empirical histogram
bar(xhist,h);

subplot(2,1,2)
h = hist(signal_samples(641:1280),xhist)/640; % generate empirical histogram
bar(xhist,h);
hold on;
plot_ghist(xhist,rx_max,sigma); % plot predicted histogram

```

Figure 1



Check

Reset

Save

Hide Answer

You have used 2 of 10 submissions

INSTRUCTIONS

Step 1: Run the available code

After you click on the **Run Code** button, the available code will return a figure with two subplots. The upper subplot will contain the predicted histogram of the received signal when $IN=0$, much like the initial plot in Task 1. The lower subplot is empty.

As presented, the first part of the program is very similar to that used in the previous tasks, except that instead of transmitting a bit sequence of 1280 zeros, it transmits a bit sequence of 640 zeros followed by 640 ones.

In this task, your job is to modify the code so that it plots the empirical and predicted histograms of the received signals for the case when $IN=0$ in the upper subplot. This part of the task is very similar to Task 1. You should also add code so that it plots the empirical and predicted histograms of the received signals for the case when $IN=1$ in the lower subplot.

Step 2: Modify the code

There are two positions in the code window that need your work.

a. The upper plot is supposed compare the empirical and predicted histograms of the received signal when $IN=0$. As presented the code only plots the predicted histogram. Based on your work in Task 1, add code lines under the comments

% Place your code below that plots the empirical histogram of the received signal samples when $IN=0$

to generate the empirical histogram of the received signal when $IN=0$. Note that the first 640 transmitted bits were 0. Use the responses of all of these in computing the empirical histogram.

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b. The lower subplot is supposed compare the empirical and predicted histograms of the received signal when $IN=1$. As presented, this subplot is blank. Based on your work above, add code lines under the comments

```
% Place your code below that
% 1. Plots the empirical histogram of the received signal samples when IN=1
% 2. Plots the theoretically predicted histogram
% Plot the empirical and theoretically predicted histogram versus xhist defined above.
```

to compute and plot these versus **xhist**, the same bin centers used in generating the histograms in the upper subplot. We use the same bin centers to enable us to compare the histograms in the upper and lower subplots.

Note that the last 640 transmitted bits were one. Use the responses to all of these in computing the empirical histogram.

You may need to review the description of the code in Task 1, in particular the description of the functions **txrx_lab07** and **plot_ghist**. What are the mean and standard deviation of the received signal when $IN=1$?

Step 3: Submit your work

Once you have completed your work, examine and compare the histograms in the two subplots. How does the distribution of the received samples when $IN=0$ differ from the distribution when $IN=1$?

Click on the **Check** button to submit your answer.



Help



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