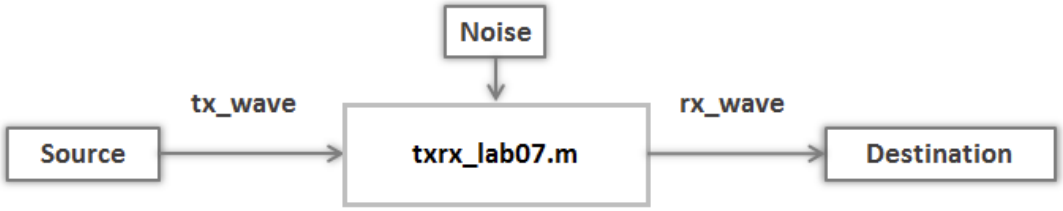
LAB 7 TASK 2 - NOISE SAMPLES

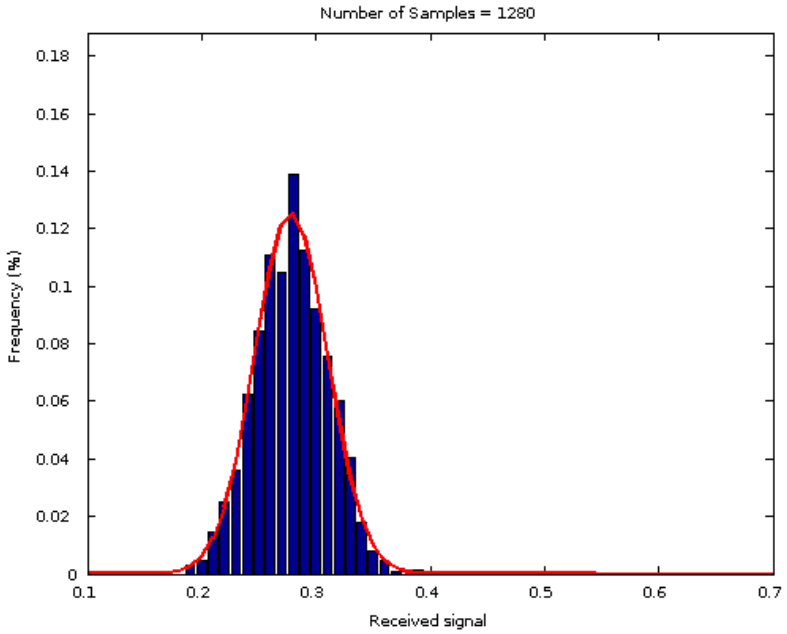
You will investigate the effect of the number of samples on the histogram.




```
% Copy your code from Task 1 below
 SPB = 50;                              % bit time in samples
tx_bs = zeros(1,1280);                 % generate the all-zero bit sequence
tx_wave = format_bitseq(tx_bs,SPB);  % create waveform following protocol

% transmit and receive over noisy channel
[rx_wave,start_ind,rx_min,rx_max,sigma] = txrx_lab07(tx_wave);
sample_ind = start_ind+2*SPB-1+SPB*[0:1279]; % set subsampling points
signal_samples = rx_wave(sample_ind);        % get the received samples

xhist = 0.1:0.01:0.7;    % centers of histogram bins

% Do not modify code above this line
nsamp = 1280;   % number of samples to use for histogram
signal_samples_firstNSAMPbits = signal_samples(1:nsamp);
```

Unanswered

Figure 1



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Run Code

Check

INSTRUCTIONS

Step 1: Copy your code from Task 1

Copy your code in Task 1 where you generated the empirical histogram for the additive noise to the blank code window above.

Step 2: Effect of the number of samples

In Task 1, you generated the empirical histogram for the first **nsamp=80** signal samples. Try adjusting the number of samples to **nsamp=200, nsamp=500, nsamp=1280** and observe the resulting histograms corresponding to different number of signal samples. You do not need to submit your work for this task. Based on your observations, **answer the questions below** for credit.

LAB 7 TASK 2 - QUESTION 1 (1/1 point)

Which one of the following phrases is the correct completion of the sentence that starts "As the number of signal samples used in computing the empirical histogram increases," ?

Please select the correct answer.

- (•) The values of the histogram converge towards the theoretical predictions. ✔
- ( ) The values of the histogram vary more widely around the theoretical predictions.
- ( ) The mean (center) of the empirical histogram increases.
- ( ) The mean (center) of the empirical histogram decreases.

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EXPLANATION

As the number of signal samples increases, the empirical histogram will converge to the theoretically predicated one. This is called statistical regularity in probability theory. There may be some variation in the mean or center of the distribution, but this is random and exhibits no systematic variation with the number of samples collected.

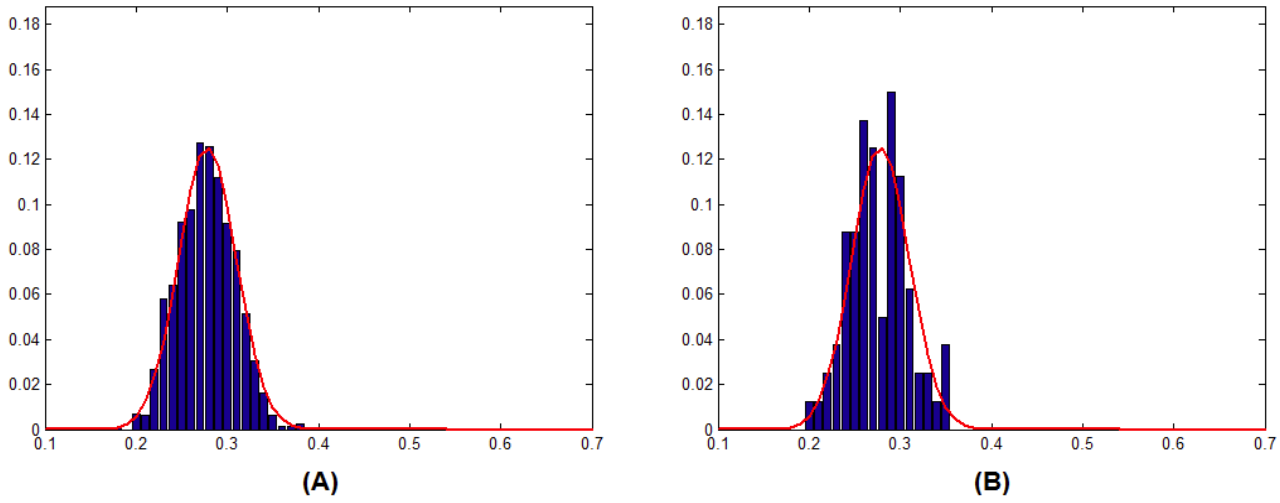
Final Check | Save | Hide Answer *You have used 1 of 2 submissions*

LAB 7 TASK 2 - QUESTION 2 (1/1 point)

Which one of the following empirical histograms (blue bars) is generated with a smaller number of samples? The red line shows the theoretically predicted distribution.

Please select the correct answer.

- ( ) A
- (•) B ✔



EXPLANATION

With a smaller number of samples, the values of the empirical histogram will exhibit more variability around the theoretically predicted histogram.

Final Check | Save | Hide Answer *You have used 1 of 2 submissions*

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