CS215 Assignment-1

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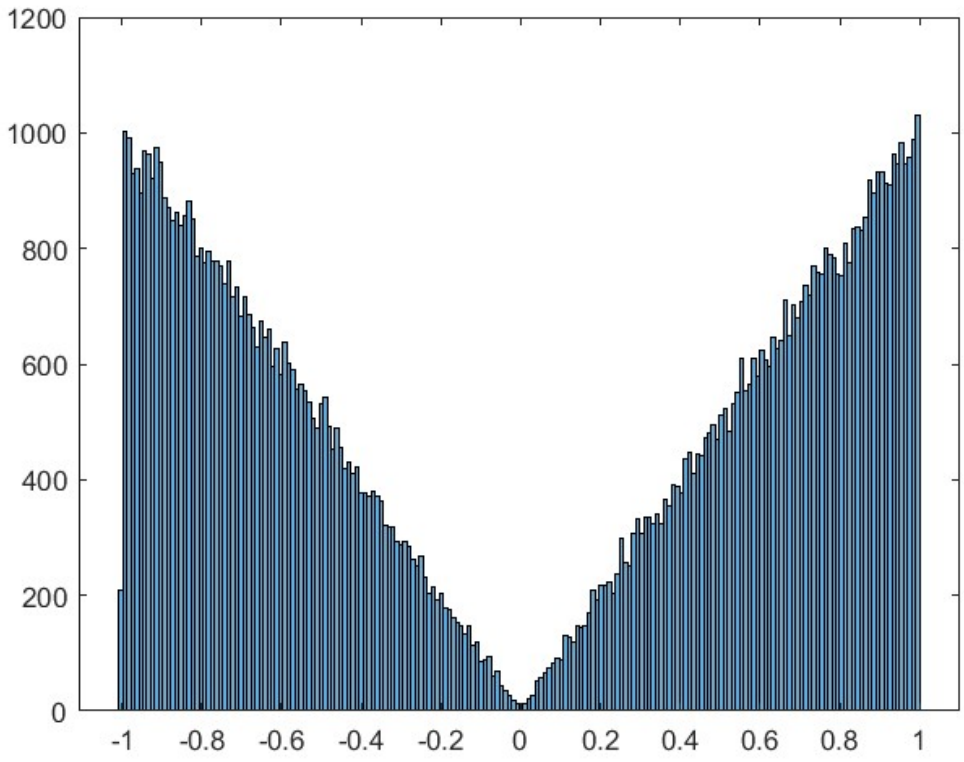
1 Writing code

Running the program Xrand.m in MATLAB gives the random number with the specified PDF, used the invcdf method to find the random number, initially took a random number using rand(), and later using invcdf method we found the random value which has to be returned with the specified PDF.

Instructions to run the code
Run the Xrand.m file in codes section, it gives the random value specified as above.

2 Histogram of X:

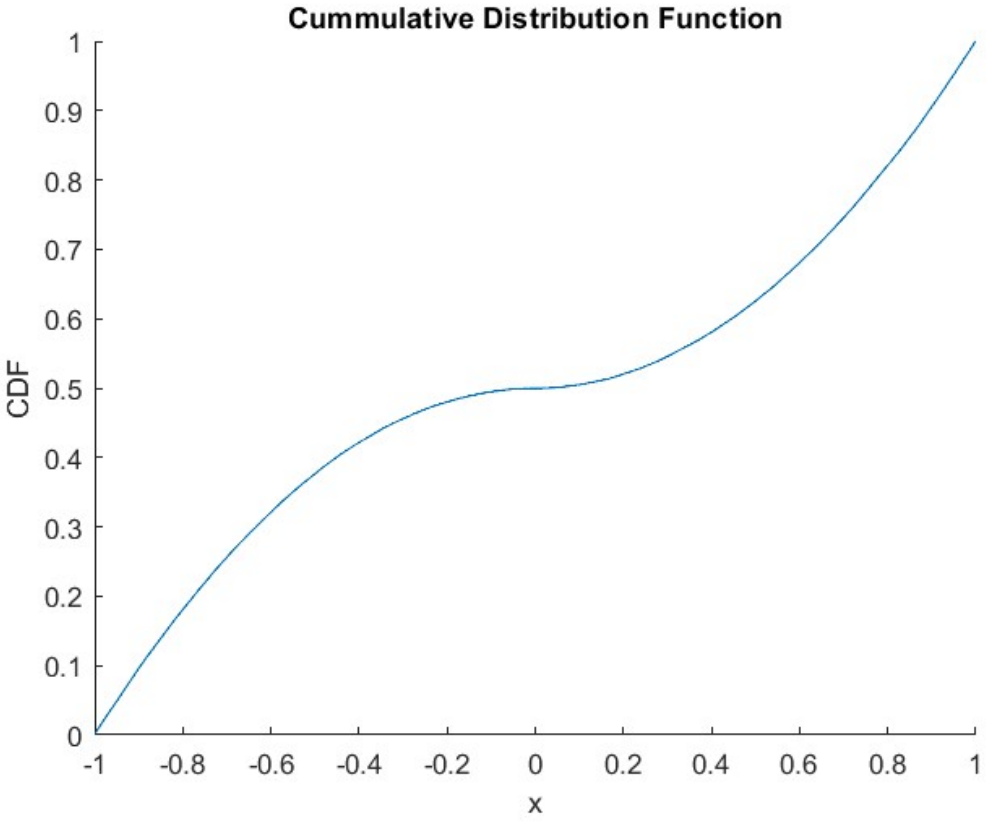
Using the random number code above, wrote a array of 100,000 random numbers with the specified PDF, and using histogram(), function in MATLAB drawn a histogram of X for 100,000 expirements, with 200bins and it came as expected(M shape).



Instructions to run the code
Run the XrandHist.m file in codes section, it gives the same histogram as above.

3 CDF of X:

Running the Xrandcdf.m code in MATLAB, gives CDF of X with specified PDF. We found CDF using histcounts(), which counts the frequency in the specified interval. Then wrote an array from -1 to 1 with 2001 gaps in between(0.01 each interval), added them by summing each of them with ncounts(i)(storing the frequency of a certain interval), adding new intervals frequency and plotted ncounts against x.



Instructions to run the code

Run the code XrandCdf.m in codes section, gives the same graph as above.

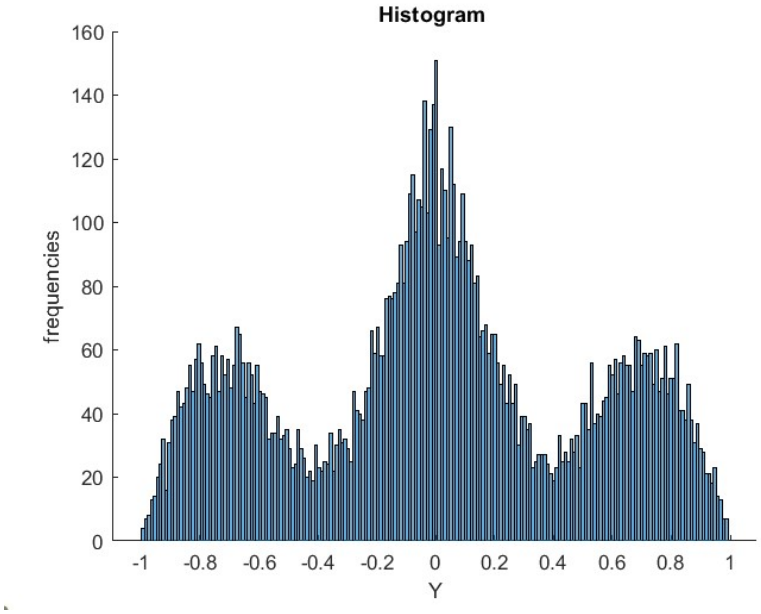
4 Code of Y

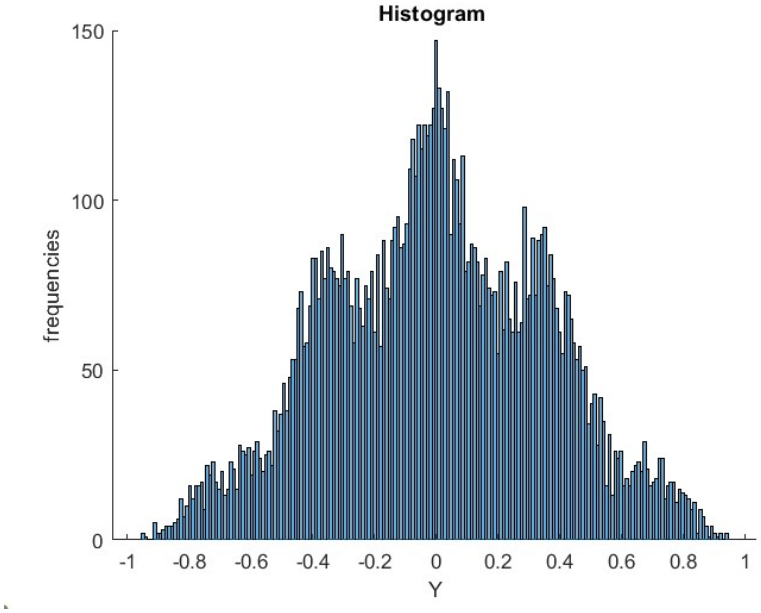
Can get the random value for Y by running Yrand.m code in MATLAB, Took the code for producing X using cdf, taken 1000 random variables X and found the average of them, it gives the random variable with the specified PDF.

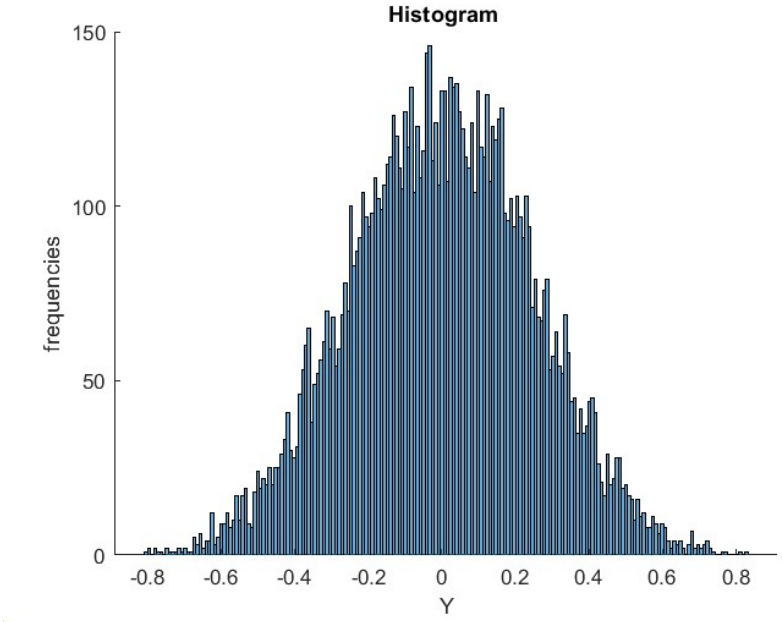
Instructions to run the code

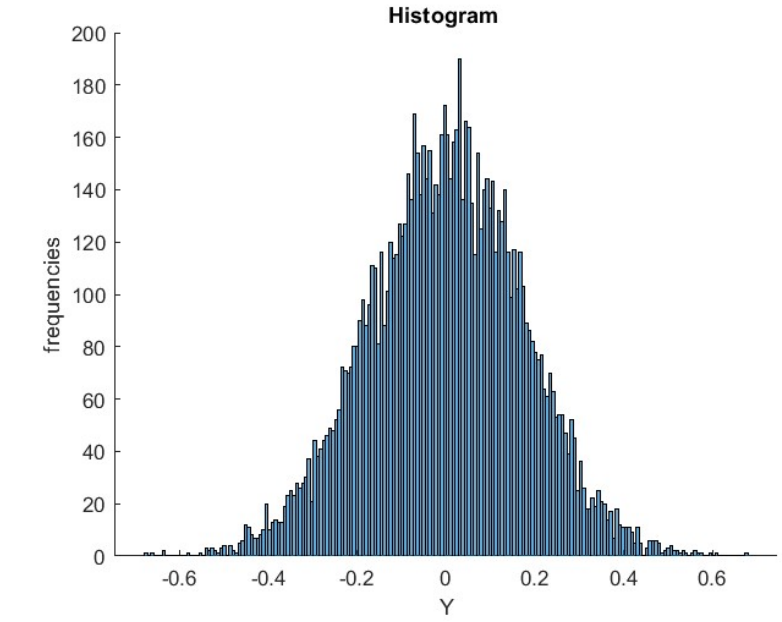
Run the Yrand.m code in codes section on MATLAB, you can get a random variable with above specified PDF.

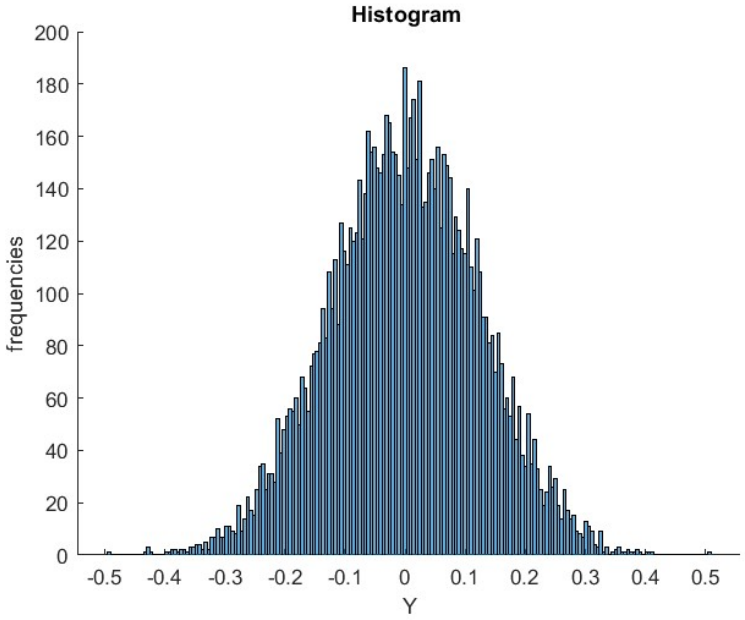
5 Plots of Histogram for PDFs of $P_Y(.)$ for N= 2,4,8,16,32 and 64 are :

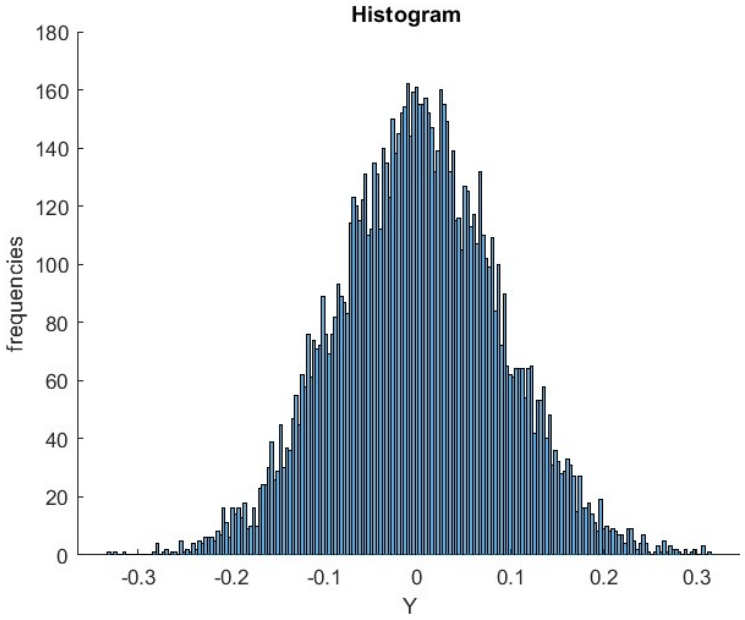





Histogram
frequencies
Y
150
100
50
0
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8


Histogram
frequencies
Y
200
180
160
140
120
100
80
60
40
20
0
-0.6
-0.4
-0.2
0
0.2
0.4
0.6

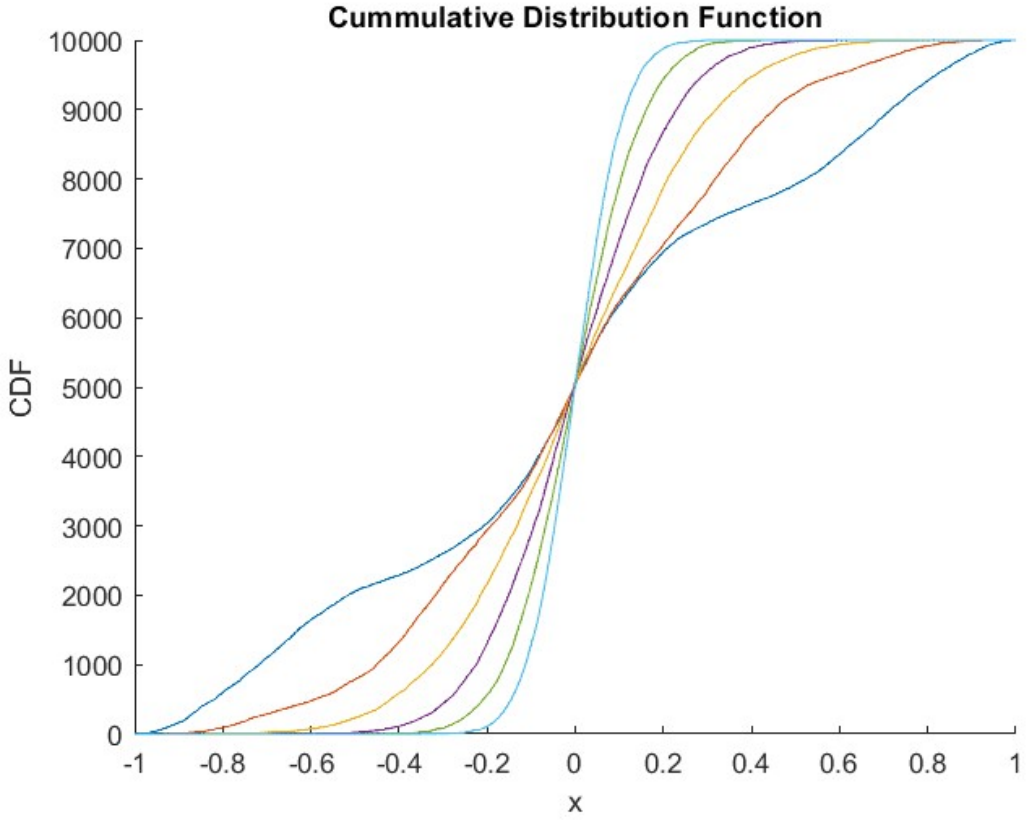




Instructions to run the code

Run the YrandHist.m code in the codes section on MATLAB, this gives only one of above, changing the values of N at the top of code, gives all other graphs above.

6 Plot of CDF for Y for N = 2,4,8,16,32 and 64



Instructions to run the code

Run the YrandCdf.m code in the codes section on MATLAB, this gives the graph by combining all the graphs of N=2,4,8,16,32,64 into same graph as above.