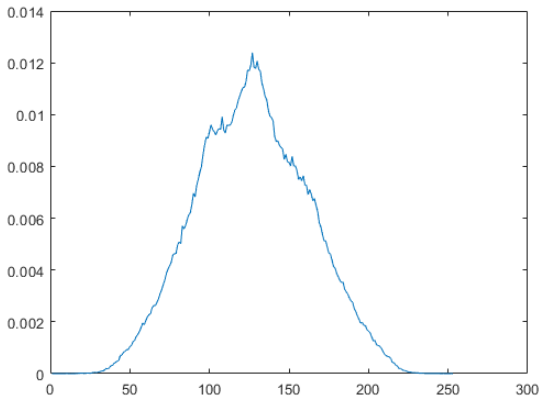
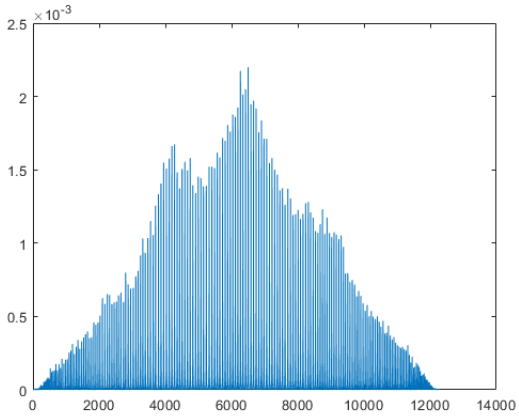
TSBK38: Labb 1

By: Ludvig Damberg(ludda756), Ludvig Hillert (ludhi842)

Random source model

The first task of the lab is to get a random distribution of the values in the array that represents the audio file. The audio file values range from –127 to 128 so the binary file is multiplied by 128 and then 128 is added so the values range from 0 – 256. In Matlab, an empty array is created with the size of the maximum value of the audio file. This array is then stored with the count of each value in the audio signal. Then, by dividing this array with the maximum size of the signal we get the probability of each value in the signal. The same is done for distributing the probability of each pair of values in the signal.





Entropy

Entropy is used to extract the mean value of the information contained in the file. This could be any kind of media like pictures or audio.

$$H(X) = \sum_{i=1}^{L} p_i \cdot i(a_i) = -\sum_{i=1}^{L} p_i \cdot \log\ p_i$$

From the formula above X is the input signal, and the entropy a measure of the average value of information contained in the signal. It could also be a measure of the uncertainty of X.

In Matlab we estimated the entropy and pair entropy, and with those values we can calculate the conditional entropy.

The first

First entropy: H(x) = 7.1638

Second entropy: H(x) = -2.4039*10^8