The goal of this project is to compare the compression performance of different wavelet transforms. For this purpose choose the Haar transform and the Daubechies 4 discrete wavelet transform. Implement them both in Matlab using the Mallat algorithm. Test the results on the sequences of the form \( s_k = \{\sin(2\pi nk/512) : n = 0, \ldots, 511\} \), \( k = 1, 2, 4, 8 \).

In the resulting sequences, threshold (i.e., set to 0) all the coefficients below a certain fixed values (say \( \epsilon = 0.01, 0.001 \), etc). Apply the inverse wavelet transform to the thresholded sequences, call it \( s'_k \).

Estimate the difference between these new sequences \( s'_k \) and the original sequences \( s_k \), for example using \( \ell^2 \) norm.

Draw conclusions about the relationship between the length of the filters, compression rates, and approximation rates.