Assignment 01

submitted for

EN3551 - Digital Signal Processing
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Progress on GitHub ⏷

12 September 2025

1 Harmonic Detection

Question 03 Five subsets of the provided signal were formed as described. The magnitude plots of the DFTs of each of these subsets are indicated in Figure 1.
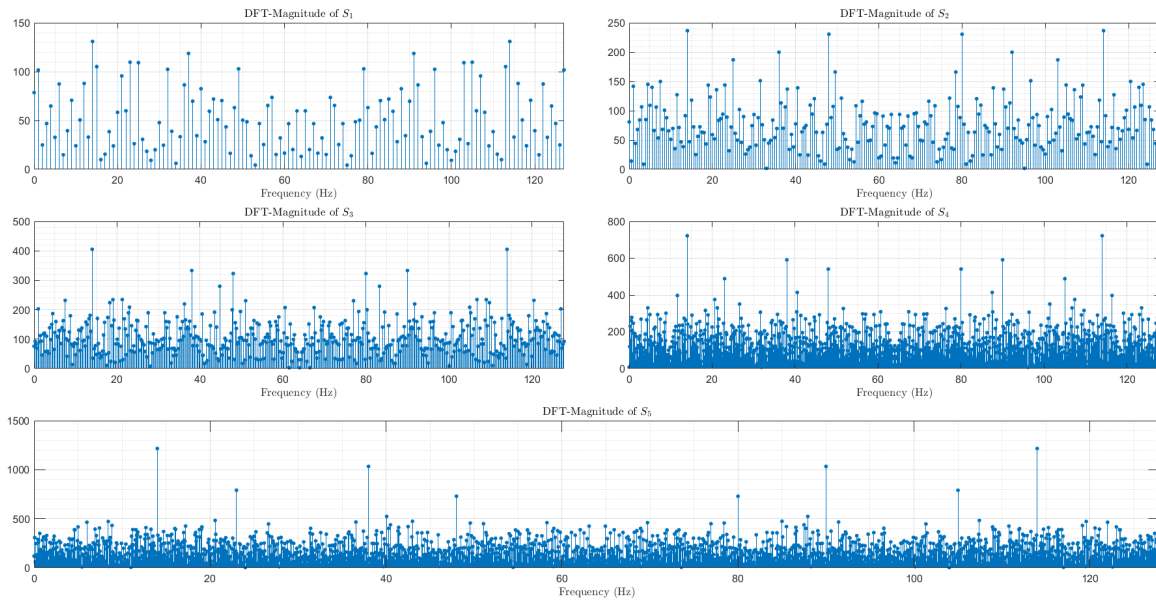

Figure 1: DFT-magnitude plots of signals S_1 through S_5

Question 04 We use this code. Figure 2 shows the magnitude plot resulting from averaging the DFTs of $L = 14$ consecutive subsets taken from the given signal.
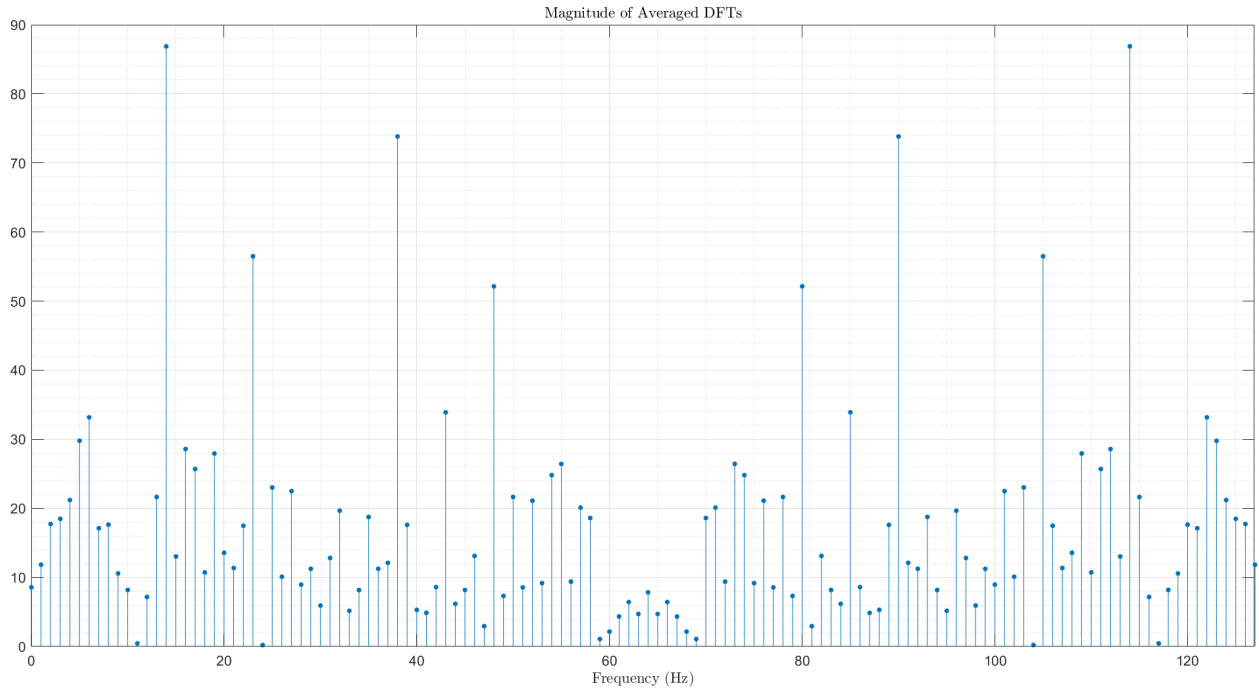
Figure 2: Magnitude plot of the averaged DFT over several subsets

2 Interpolation

Question 01 A plot of the first 50 samples of the loaded signal is given in Figure 3.
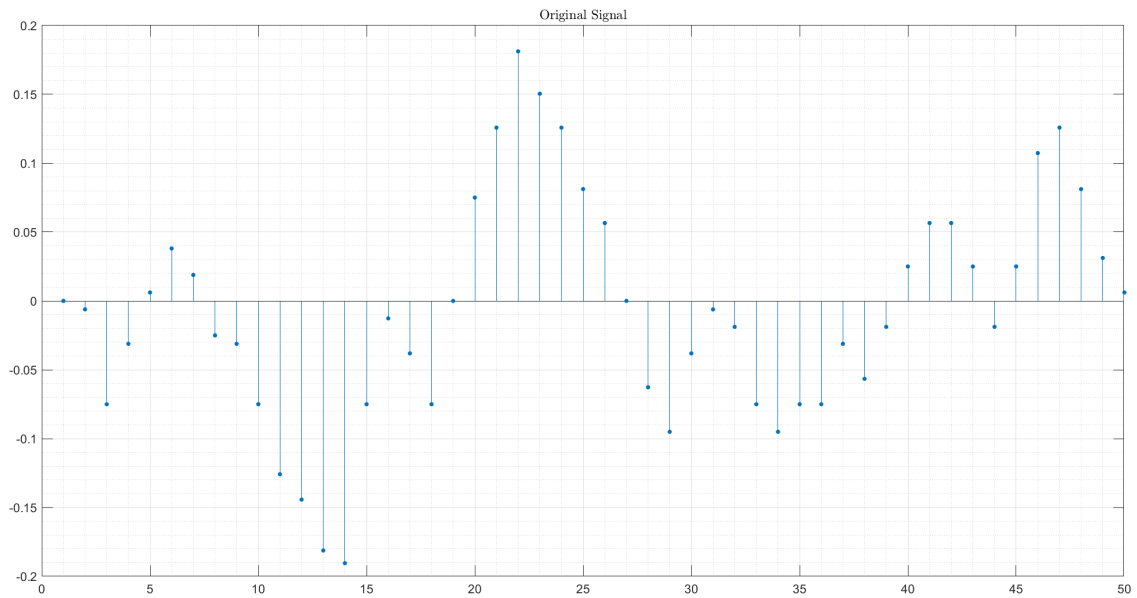

Figure 3: Original signal

Question 03 Steps (a) through (c) were carried out using the code in Listing X in Appendix A. Outputs obtained from the code and relevant plots are as shown in Figures X, Y, and Z respectively. An analysis of the results obtained follows.
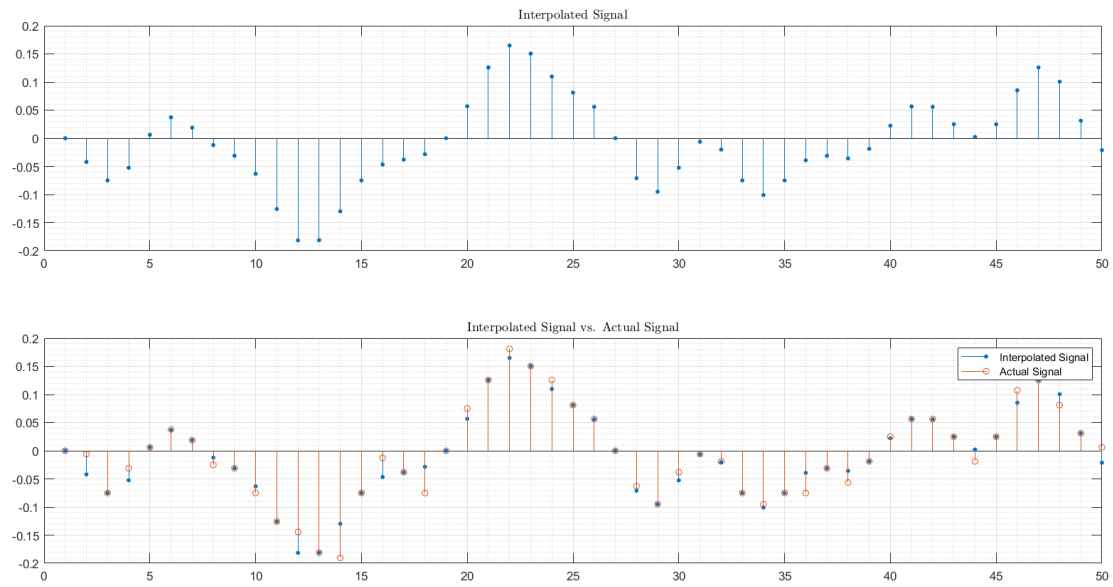
(a)

Figure 4: x_2 Interpolated

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Norm of difference: 6.1447
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Listing 1: abc

(b) b

(c) c

(d) d

A   Code Snippets

A.1   Harmonic Detection

A.2   Interpolation