Homework 2

ELEN0071 University of Lige, Spring 2020

Due: Wednesday 15/04/2020 11:59pm

Instructions: Name your homework report `LastName1_LastName2_LastName3_homework2.pdf` (in alphabetical order). Submit your homework report on the Montefiore submission platform (`http://submit.montefiore.ulg.ac.be`).

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1. **Noise elimination.** An electrocardiogram signal was recorded at the sampling frequency of 250 (`hw2_electrocardiogram.mat`). The signal is corrupted with noise. Our goal is to recover the original signal.

   (a) Plot the given signal entirely (the time axis should be expressed in second).

   (b) Plot only 3 seconds of the given signal (from the second 2 to second 5).

   (c) Plot the single-sided magnitude spectrum of the given signal.

   (d) Identify the noise frequencies.

   (e) Recover the original signal and plot 3 seconds of the both (noise-corrupted and original) signals in a single frame.

   (f) Explain clearly your filter design procedure.

(a) On a fait ça dans 1- FFT
(b) Only 3 seconds, because the signal is long and very dense we want to plot it from second 2 to second 5 to be more visible : we'd like to see the noise,...
(c) We have done it in 2 -FFT
(d) We may not only have only 1 noise frequency but several frequencies. The main noise frequency and its harmonics
(e) To eliminate the noise, we may need 2 or 3 Noche filters cascaded. WWe filter the signal with the 1st Noche then the result should be filtered in the second noise => all the noise will be eliminated