Task

Initial data: a harmonic signal modulated by 2 frequencies.

To do step by step:

1. Choose a sampling frequency, a time of analysis and a number of samples;
2. Generate a signal with the specified type of a modulation and frequencies;
3. Apply a window, if a leakage is considered;
4. Add white noise to the signal;
5. Perform the specified type of averaging and calculate the SNR improvement;
6. Get a complex envelope and detect information signals;
7. Plot all signals and its spectrums (for the spectrum calculation use the specified instrument);

If variant specifies using the FFT, but there are no options to obtain 2^N number of samples, you can use the DFT.

Requirements

You must upload an archive with the solved task to our website. The archive must contain the main script named "Start.m" and files with all supporting functions. The archive must be named by the following pattern: <Surname>_<Initials>. For example: "Ivanov_IA".

You **must** use the following functions that you have written for the Grader:

- `mydft` – the DFT calculation;
- `myfft` – the FFT calculation;
- `mySignal` – the addition noise to the signal;
- `mySNR` – the SNR calculation;
- `myAveraging_Coh(x)` or `myAveraging_Exp(x, alpha)` – averaging functions;
- `mySignalDetection(x, t, fc)` – the detection function.

The mentioned function must pass all checks from the Grader.

Plagiarism is forbidden and will be punished!