

Signal and System Course Project

Sound Recording and Analysis

Project rules

- 1- Each group should have three students
- 2- The project should be implemented using python
- 3- Grades are based on the submitted code as well as a project evaluation
- 4- All the values in the project should be variable and could be changed during the evaluation
- 5- You may use existing python Fourier transform functions (but you have to adjust the parameters correctly)

In this project you will use python to do the following

- 1- Each member of the group has to record the following sentence
"The signals course is useful and interesting"
You have to know exactly the sampling rate used.
- 2- The time signals $x(t)$ of all the group recording should be plotted
- 3- Implement a function to scale and time the recoded time signal
$$y(t) = x(at - t_0)$$
and play the time scaled and shifted version
- 4- Add the time scaled and shifted signal to the original signal and play the resulting signal
$$y(t) = x(t) + x(at - t_0)$$
- 5- Convert the find the Fourier transform of the each voice signal
- 6- Shift the Fourier transform function by a frequency equal to ω_s and perform an inverse Fourier transform and play the time version
- 7- Run the Fourier transform through a low pass filter with cutoff frequency ω_c and perform an inverse Fourier transform to the time domain and play the signal
- 8- Run the Fourier transform through a High pass filter with cutoff frequency ω_c and perform an inverse Fourier transform to the time domain and play the signal
- 9- Multiply the frequency transform by the following function

