

Project #1

Generate a code to play 2 seconds of 200-Hz sine wave with a sampling rate of 8,000 Hz. Then, change the sound frequency from 200 Hz to 7,800 Hz. Compare the results. Also, compare the waveforms. What other frequencies would give similar results?

Project #2-1

There are 40 horizontal strip images with a size of 10X400. The filename is 'strip_image_1_X.jpg', where X ranges from 1 to 40. If you concatenate the images from top to bottom, you will see a picture of a famous person. Who is this person?

(Hint : use *for* loops. Hint functions: *cat*, *imread*)

Project #2-2

There are 40 vertical strip images with a size of 400X10. The filename is 'strip_image_2_X.jpg', where X ranges from 1 to 40. If you concatenate the images from left to right, you will see a picture of a famous person. Who is this person?

Project #3

The sawtooth function can be represented by a Fourier series, sum of sine and cosine functions.

a = -0.0200 -0.1194 -0.1175 -0.1144 -0.1101 -0.1047 -0.0983 -0.0910 -0.0829

b = 0 -0.6258 -0.2967 -0.1802 -0.1172 -0.0761 -0.0463 -0.0234 -0.0052

These are the least-squares Fourier coefficients, a_m and b_m , $m=0, 1, \dots, 9$, of the sawtooth function.

Draw the sawtooth function using the least-squares Fourier coefficients with $N=50$. Also, draw the sawtooth function with $n=25$, and 10.

(Hint: Use the example of the square function.)

