Lab 2 Discrete-time signals and systems

- Text 2.5 sinusoidal signal $\cos(\omega_0 n + \theta_0)$ is periodic if the normalized frequency is a rational number, that is $f_0 = \frac{M}{N}$.
- Text 2.6 load 'handel.mat' in the MATLAB. Test the effect of sub-sampling
- Text 2.15 Average filter using Lena image

HW. Write my_conv.m that computes the convolution sum of two finite sequences.

```
clear all;
close all;
n = -50:50; % support
w1 = 0.1; % angular frequency
x1 = cos(w1*n-pi/5);
w2 = 0.1*pi; % angular frequency
x2 = cos(w2*n-pi/5);
subplot(2,1,1)
stem(n,x1);
subplot(2,1,2)
stem(n,x2);
```

```
close all; clc
load handel
n = 1:length(y);
sound(y,Fs); pause(1)
y_ds2_ind = mod(n,2)==1;
sound(y(y_ds2_ind),Fs/2); pause(1)
y_ds4_ind = mod(n,4)==1;
sound(y(y_ds4_ind),Fs/4)
```

```
% P0215: Filtering 2D image lena.jpg using 2D filter
close all; clc
x = imread('lena.jpg');
% Part (a): image show
imshow(x,[])
% Part (b):
hmn = ones(3,3)/9;
y1 = filter2(hmn,x);
figure
imshow(y1,[])
% Part (c):
hmn2 = ones(5,5)/25;
figure
y2 = filter2(hmn2,x);
imshow(y2,[])
```