

Assignment 1

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For each of the following sections try the operations required and provide the results.

1 Warming up

- Run matlab and type

```
intro
```

at the command line.

- Follow the steps to familiarize with Matlab

2 Basic operations in Matlab

1. Matlab as a calculator

```
pi*pi -10
sin(pi/4)
ans^2    %what value does and hold?
who %what do you get?
x=4
who %and now?
zz=3+4i
conj(zz)
abs(zz)
angle(zz)
real(zz)
imag(zz) %what do conj, abs, angle. real represent?
```

3 Plotting in Matlab

```
help plot
xx= [-3 -1 0 1 3];
yy=xx*xx-3*xx; %why this product does not work? Fix it!
                % If you are having troubles try help arith
plot(xx,yy)
```

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4 Listening in Matlab

1. Run the matlab sound demo by typing

```
xpsound
```

at the matlab prompt.

2. Create a sinusoids at 2kHz of 1 sec long.

```
dur =1.0;
fs = 8000;
tt =0:(1/fs):dur;
xx =sin(2*pi*2000*tt);
sound(xx,fs);
```

3. Now create another sinusoid of 2 seconds long at 300 Hz with sample rate of 22050.

5 Creating scripts and functions in Matlab

1. Save the previous lines to create and listen to a sinusoids in a file called mysound.m and run it as a script (run mysound from the command line)
2. Write a function that generates a cosine wave. The inputs of the function must be the frequency and the duration of the waveform in seconds. The output is the wave itself.

6 Experimenting with vectors and waveforms

Write a function that creates a periodic waveform you like. The function must be able to plot the waveform and listen to it.

7 Experimenting with filters

- Write again a function that creates a sinusoids at 200 Hz at a sample rate of 44100Hz that lasts 2 seconds.
- Listen to it.
- Filter it using the basic lowpass filter we saw in class and listen again.

8 Experimenting with envelopes

(Optional for who already knows Matlab well)

Try to change attack and decay of the sinusoids you built in the previous functions in order to have smoother attacks, decays.