

【111 Spring】 535354 Biomedical Engineering

Instructor: Jerry Li-Chia Tai

Combined lab and homework assignment

```
#Load the usual NumPy and Matplotlib packages but also 'glob' so that we can read many files more easily.  
import matplotlib.pyplot as plt  
import numpy as np  
import glob  
%config InlineBackend.figure_format = 'retina'
```

With the command `np.loadtxt(...)`, load the solution file and your data set. Store the length of the data sets in the variable 'nNumbers'. We know the number is 100 but Jupyter does not. Use this variable whenever it is needed later. Plot your data set and the solutions in one diagram. Add a labels and legend with '`plt.legend()`'. Insert one comment how well they agree.

...

...

...

```
# comment: ...
```

We want plot both data sets in a different way. Make a XY scatter plot (no lines) where X points are your guesses and the Y points are the solutions. Explain how should this plot should look if you had guessed very accurately. Does your plot look ideal?

...

Plot the difference between your data and the solution. (Taking the difference requires only one line of code.) Add a thin line that marks zero deviation. Print the values of the most positive and most negative deviation. Please briefly explain these extreme discrepancies.

```
...
```

```
# Comment: ...
```

Compute the average of the difference between your data and the solution. Include the sign of the difference in the summation. Then write a comment on the sign of the average.

```
...
```

```
# Comment: ...
```

Compute and print the variance and the standard deviation sigma between your data set and the solution as described on the lecture notes.

```
...
```

Let us assume we know the average is zero. Let us recalculate the variance and the standard deviation.

```
...
```

Let us assume you have stored the deviation between your guesses and the solutions in a vector 'diff'. With the command 'plt.hist(diff, 10)' generate a probability distribution of a histogram of these deviations. Adjust the number of bins, 10, until you are happy with the curve.

```
...
```