

CS423

Hand on experience with your first data

Defining a function in Scilab

```
function [y1, ..., yn]=foo(x1, ...,xm)
```

```
endfunction
```

- where [y1, yn] is a list of return values
- (x1,....xm) is a list of input arguments
- No return keyword is needed.
- The return values need only be defined within the function

Using a predefined function

- Like import keyword in Python
- If one wishes to call a function which was defined in 'filename.sci' or 'filename.sce' file
- One needs to let Scilab knows that function by

`exec('filename.sci', 'mode')`

where 'mode' is usually -1

Plotting a graph

- Can be done with the following syntax

```
plot(x,y, 'style')
```

- Calling more plot() will overlay new plot on the old ones.
- To create new figure use figure(n), where n is an ID for the figure
- One may want to put multiple plots in one figure
- To do that use subplot(m,n,p), where m times n is number of plots in the subplot and p is figure's position on the grid.

Saving your awesome figures

- One may want to save the resulting graph for further application.
 - `xs2eps(gcf(), 'filename.eps')`
 - `xs2jpg(gcf(), 'filename.jpg')`
- And many more!

The iris dataset

- Introduced by Ronald Fisher
- Consists of 50 samples from each of three species
 - Setosa, Virginica and Versicolor
 - Features are stored in matrix 'x'
 - While labels are stored in matrix 'y' using numeric values (1,2,3)

The three species

- Setosa



- Virginica



- Versicolor

Characteristic of the dataset

- There are 4 features
 - Length and width of sepals.
 - Length and width of petals.
 - All measured in centimetres.
 - The task is to differentiate between the three species using the mentioned four features.



Tasks

- Try to load the dataset into Scilab
 - The dataset is in Matlab's form but can be imported using `loadmatfile()` function
- Try to visualise the data on 2D graph using some two features.
 - How ?
 - Can you improve this ?
- Now visualise again using two most important principle components

Useful functions

- Covariance matrix = `cov()`
- Eigenvectors and eigenvalues = `eigs()`