

Lab 1

We will learn how to read data in from a text file, how to handle variables, how to plot data, and how to save these plots.

1. Directories. Create a directory within your “home directory” entitled “timeseries”. Create a directory within this “timeseries” directory entitled “lab1” using the “change dir...” option under the file menu.
2. Launch R. Change the working directory to “lab1”.
3. Download files. Obtain the data file,” soi.dat” from NTUlearn. Put this file into “lab1”. We want to import this data into R. One way to do this is to use the `scan()` command or `read.table()` command; simply type

```
scan("soi.dat")
```

Or `read.table("soi.dat")`

R has read the numbers and output them to the screen. We would like to store the numbers so that we can work with them. To do this, we declare a variable `soi` and set it equal to the output of the `scan()` command, i.e. the list of numbers. Type

```
soi=scan("soi.dat")
```

4. Command line. Now, we will get familiar with using the command line:
 - Type `ls()`. This command lists all the variables present in your workspace. Right now there should only be `soi`.

- To check the contents of a variable, simply input the name of the variable, such as `soi`.
- Create a variable `temp` equal to 2 using the command `temp=2`
- Remove the variable `temp` by typing `rm(temp)`.
- Now, check to make sure that it's gone by typing `ls()`.

5. Easy plotting. Making attractive plots is one of R's strong suits.

- Create a simple plot of the `soi` variable using `plot(soi)`.
- We can expand on this by changing the x and y labels and adding a title.

```
plot.ts(soi,xlab="time", ylab="Southern Oscillation Index", main="Time Series Plot")
```

- Now, download the file “recruit.dat”, and load the data into the variable `recruit`.

6. Time series plots. Since these time series are related, we would like to plot `soi` and `recruit` on the same plot. Right now we have both variables as basic vectors. We want to first plot them as time series which makes the graphs more attractive and easier to interpret.

- To plot a vector as a time series we can use the following command:

```
plot.ts(soi)
```

Notice the differences from how the graph appeared before.

- We want to plot both series together. First, we need to split up the plot “device”. We do this with the command

```
par(mfrow=c(2,1))
```

This will give two rows and one column.

- Now, we plot both series by typing `plot.ts(soi)` and then entering `plot.ts(recruit)`.
- We can save this plot in any format that we would like (pdf, postscript, jpg, etc). Save this graphic as “joint.jpg”.

7. Saving your work. You can save the current variables into a file using the following command

```
save.image("lab1.Rdata")
```

2. Practice.

- 1) Graph the errors for each model for question 1 in Tutorial 1 and plot the forecast errors against time and. Have you observed any pattern from the plots for model A, B, C ?

Below is the R code for plotting forecast error of model A ?

```
x<-c(25,12,7,5,4,0,-4,-11,-17,-21,-28,-34,-21,-13,-7,-2,5,9,15,19)
plot.ts(x,xlab="time",ylab="forecast error",main="forecast error plot")
```