

A Quick Start Guide to R using Jupyter with UVic Netlink ID Login

by Nicholas Karlson – draft version – comments welcome

Using R effectively entails learning a skill. For example one could read a book on how to play golf, e.g. swing a club, hit a wedge, a putter, and so on but this conceptual knowledge would not be enough to realistically play golf. To do so requires practice and learning by doing since to play golf requires a skill in addition to conceptual knowledge. Becoming effective at R is analogous. A great many conceptual documents are freely available on the internet regarding R (two will be mentioned shortly). The quick start guide presented here will make use of these two documents to provide information that will allow the user to learn by doing. This quick start guide is intended to be a perpetual work in progress. Please feel free to comment on this guide as this feedback is potentially quite helpful for keeping this perpetual work moving in a beneficial direction.

Quick Start

Step 1

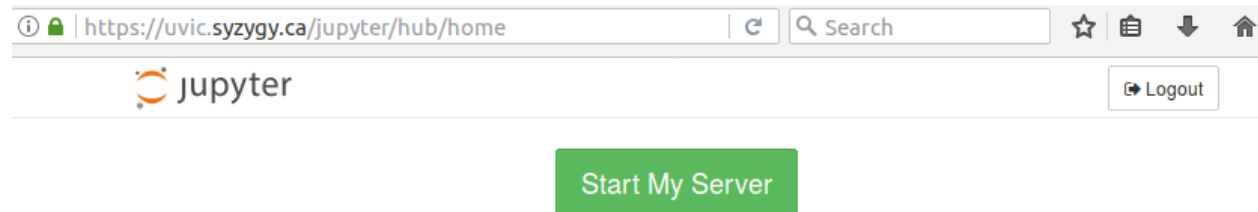
Using web browser of choice go to:

<https://uvic.syzygy.ca/jupyter/>

This will redirect to netlink ID login.

After login there is a redirect to one's personal UVic Jupyter server account.

In pictures, after redirect click Start My Server:



The location to view Jupyter notebooks is:

https://uvic.syzygy.ca/jupyter/user/nkarlson/tree | Search

jupyter Control Panel Logout

Files Running Clusters

Select items to perform actions on them. Upload New ↕

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<input type="checkbox"/>	📁	R
<input type="checkbox"/>	📄	F-W-book-free-intro-chapter.ipynb
<input type="checkbox"/>	📄	GNU-Free-Book.ipynb
<input type="checkbox"/>	📄	Lab10-Econ246-Nov2016.ipynb
<input type="checkbox"/>	📄	Lab3-Econ246.ipynb
<input type="checkbox"/>	📄	Lab4.ipynb
<input type="checkbox"/>	📄	Lab5-Econ246-Cl.ipynb
<input type="checkbox"/>	📄	Lab8-Econ246-2016-Nov-14-to-19.ipynb
<input type="checkbox"/>	📄	lab9-Econ246-variance-test.ipynb
<input type="checkbox"/>	📄	R-Hello-World.ipynb

To create an R Jupyter notebook click new dropdown and select R:

Home - Mozilla Firefox

Inbox (39) Anaconda UVic-Jupy upload-nb info-Anacr Notebook User guide Home x +

https://uvic.szygy.ca/jupyter/user/nkarlson/tree

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Files Running Clusters

Select items to perform actions on them.

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- Text File
- Folder
- Terminal
- Notebooks
- Julia 0.4.7
- Python 2
- Python 3
- R

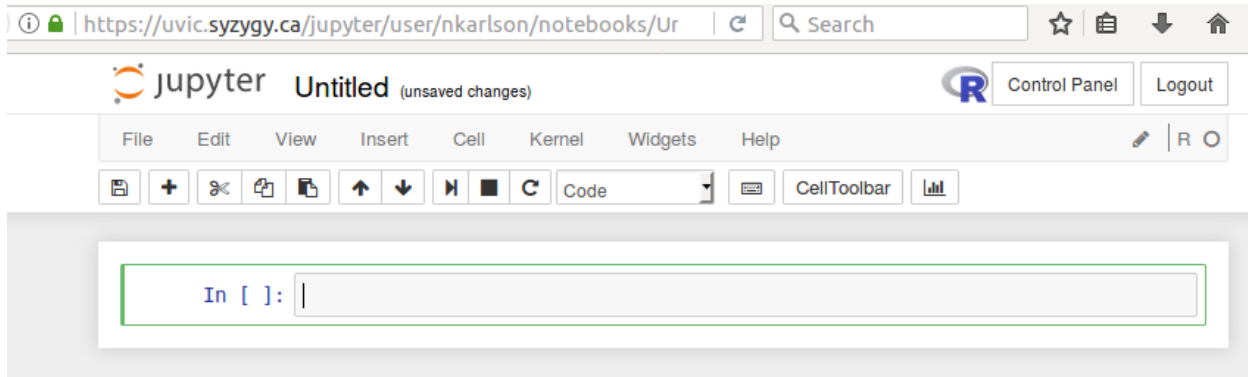
Create a new notebook with R

https://uvic.szygy.ca/jupyter/user/nkarlson/tree#

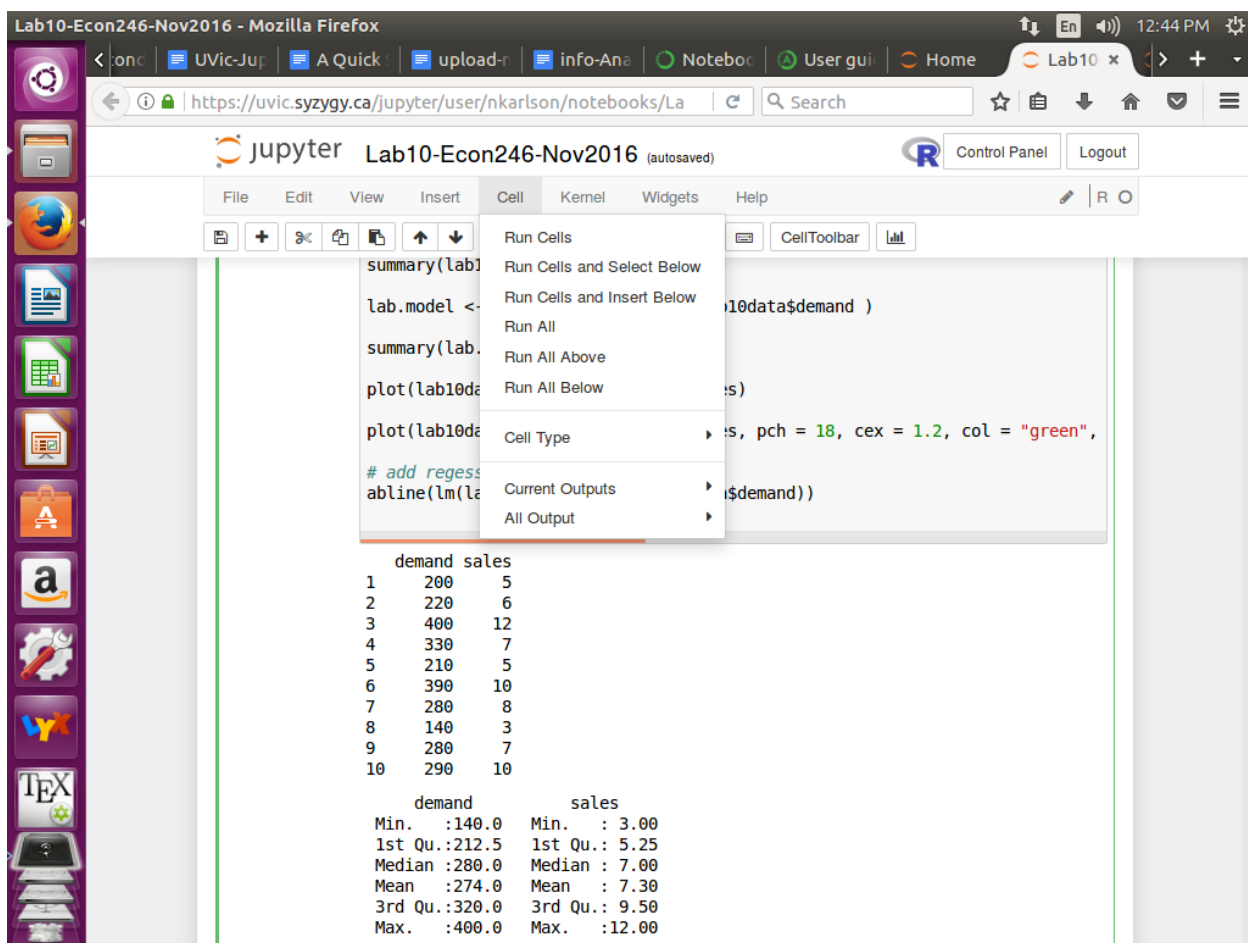
One may now enter R code (to type in R code select Code from the dropdown next to the black square). Note, R is case sensitive so `mydata <- c(3,4,52,3)` is not the same as `mydata <- C(3,4,52,3)`. When typing in R examples use the same case as in the example. Also note that there is built-in functionality that comes with a basic R installation but there is also a huge library of free additional functionality (web search CRAN IPSUR for an example). For example the Jupyter installation available to UVic netlink ID holders has the library `car` (also referred to as package) installed and can be accessed with a line of R code:

```
library(car)
```

However the package `IPSUR` is not available. Also you may find R code on the web and realize that it won't run on UVic's Jupyter because the code uses an R package (library) that is not installed.



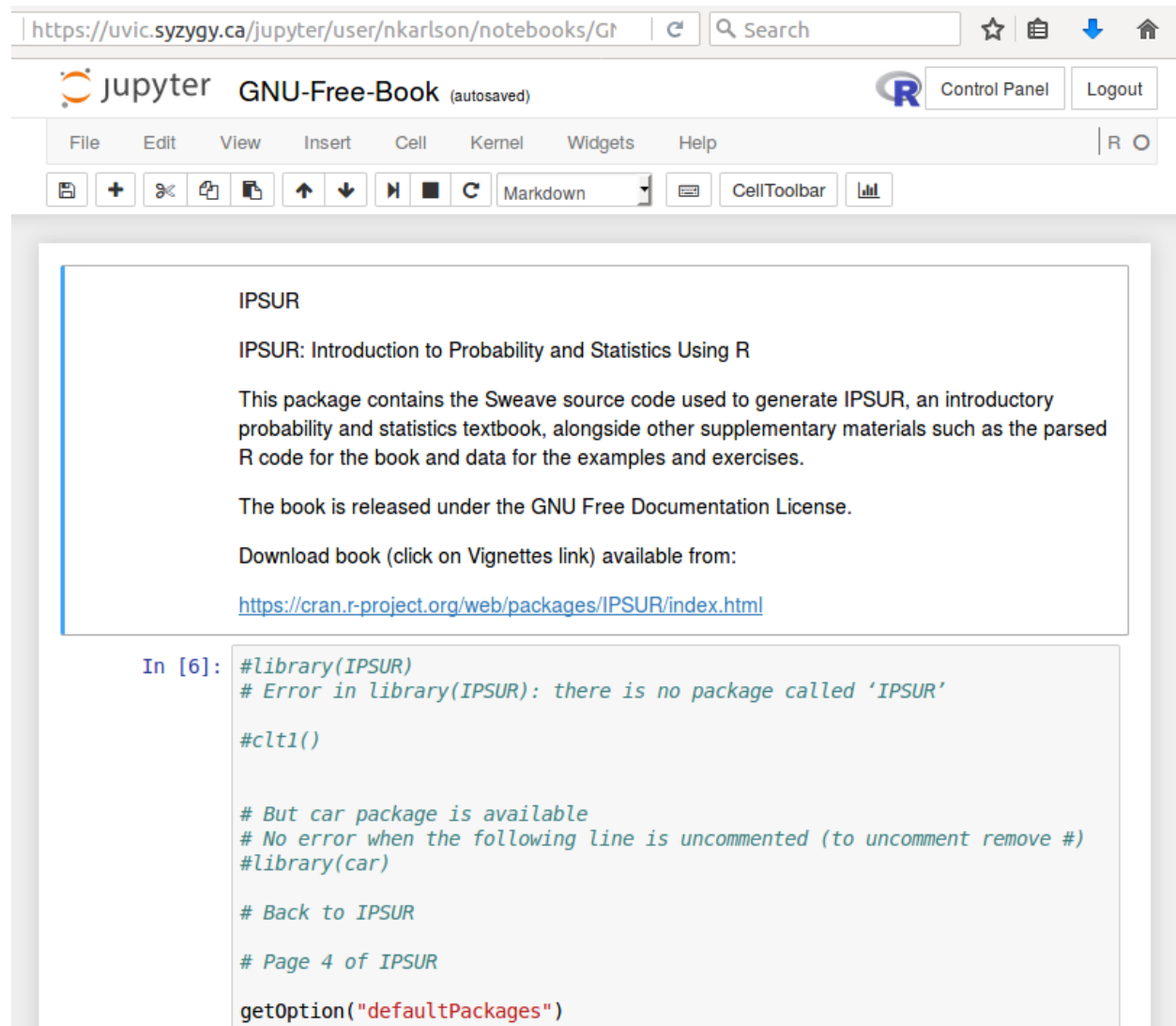
To run R code click Cell menu and select Run Cells



As a quick start download the IPSUR book and the free chapter associated with the book, “An R Companion to Applied Regression, 2nd ed.” by Fox and Weisberg. There are also examples of basic descriptive statistics, hypothesis tests, and regression if you look at the notebooks referenced in this quick start guide (below for more details).

IPSUR Reference:

<https://anaconda.org/esdot/gnu-free-book>



The screenshot shows a Jupyter Notebook interface. The browser address bar displays `https://uvic.syzygy.ca/jupyter/user/nkarlson/notebooks/Gt`. The notebook title is "GNU-Free-Book (autosaved)". The interface includes a menu bar with "File", "Edit", "View", "Insert", "Cell", "Kernel", "Widgets", and "Help". Below the menu is a toolbar with icons for file operations and a "CellToolbar" dropdown menu. The main content area contains two cells:

IPSUR

IPSUR: Introduction to Probability and Statistics Using R

This package contains the Sweave source code used to generate IPSUR, an introductory probability and statistics textbook, alongside other supplementary materials such as the parsed R code for the book and data for the examples and exercises.

The book is released under the GNU Free Documentation License.

Download book (click on Vignettes link) available from:

<https://cran.r-project.org/web/packages/IPSUR/index.html>

In [6]:

```
#library(IPSUR)
# Error in library(IPSUR): there is no package called 'IPSUR'

#clt1()

# But car package is available
# No error when the following line is uncommented (to uncomment remove #)
#library(car)

# Back to IPSUR

# Page 4 of IPSUR

getOption("defaultPackages")
```

The screenshot shows a Jupyter Notebook interface. The browser address bar displays <https://uvic.syzygy.ca/jupyter/user/nkarlson/notebooks/G/>. The notebook title is "GNU-Free-Book (autosaved)". The interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for file operations and execution. The code cell contains the following R code:

```
# But car package is available
# No error when the following line is uncommented (to uncomment remove #)
#library(car)

# Back to IPSUR

# Page 4 of IPSUR

getOption("defaultPackages")

# p.7

2 + 3 #add
|
4*5/6 #multiply and divide

7^8 # 7 to the 8th power
```

The output of the code cell is:

```
'datasets' 'utils' 'grDevices' 'graphics' 'stats' 'methods'

5

3.33333333333333

5764801
```

To view a web version of the above (where you can copy and paste into your own Jupyter R notebook) visit:

<https://anaconda.org/esdot/gnu-free-book>

Fox and Weisberg book (ch. 1 - free chapter available for download under PREVIEW (see <https://us.sagepub.com/en-us/nam/an-r-companion-to-applied-regression/book233899#tabview=samples>

)

Example:

<https://anaconda.org/esdot/f-w-book-free-intro-chapter>

An R Companion to Applied Regression 2nd , by John Fox (Author), Sanford Weisberg (Author)

Book companion source: <http://socserv.socsci.mcmaster.ca/jfox/Books/Companion/>

Free chapter source: <https://us.sagepub.com/en-us/nam/an-r-companion-to-applied-regression/book233899#tabview=samples>

In [2]: `#car package`

p.24 (free chapter)

```
library(car)
some(Duncan)
summary(Duncan)
```

	type	income	education	prestige
reporter	wc	67	87	52
welfare.worker	prof	41	84	59
store.manager	prof	42	44	45
electrician	bc	47	39	53
RR.engineer	bc	81	28	67
gas.stn.attendant	bc	15	29	10
coal.miner	bc	7	7	15

https://uvic.syzygy.ca/jupyter/user/nkarlson/notebooks/F-1 Search ☆ ☰ ⬇️ 🏠

jupyter F-W-book-free-intro-chapter (autosaved)

 Control Panel Logout

File Edit View Insert Cell Kernel Widgets Help R O

           CellToolbar 

p.24 (free chapter)

```
library(car)
some(Duncan)
summary(Duncan)
```

	type	income	education	prestige
reporter	wc	67	87	52
welfare.worker	prof	41	84	59
store.manager	prof	42	44	45
electrician	bc	47	39	53
RR.engineer	bc	81	28	67
gas.stn.attendant	bc	15	29	10
coal.miner	bc	7	7	15
truck.driver	bc	21	15	13
soda.clerk	bc	12	30	6
watchman	bc	17	25	11

```

type      income      education      prestige
bc :21  Min.   : 7.00   Min.   : 7.00   Min.   : 3.00
prof:18  1st Qu.:21.00   1st Qu.: 26.00   1st Qu.:16.00
wc   : 6  Median :42.00   Median : 45.00   Median :41.00
      Mean  :41.87   Mean   : 52.56   Mean   :47.69
      3rd Qu.:64.00 3rd Qu.: 84.00 3rd Qu.:81.00
      Max.  :81.00   Max.   :100.00  Max.   :97.00
```


https://uvic.syzygy.ca/jupyter/user/nkarlson/notebooks/F-1 Search

jupyter F-W-book-free-intro-chapter (autosaved) Control Panel Logout

File Edit View Insert Cell Kernel Widgets Help

Markdown CellToolbar

```
In [5]: (duncan.model <- lm(Duncan$prestige ~ Duncan$income + Duncan$education))
summary(duncan.model)
```

Call:
lm(formula = Duncan\$prestige ~ Duncan\$income + Duncan\$education)

Coefficients:
 (Intercept) Duncan\$income Duncan\$education
 -6.0647 0.5987 0.5458

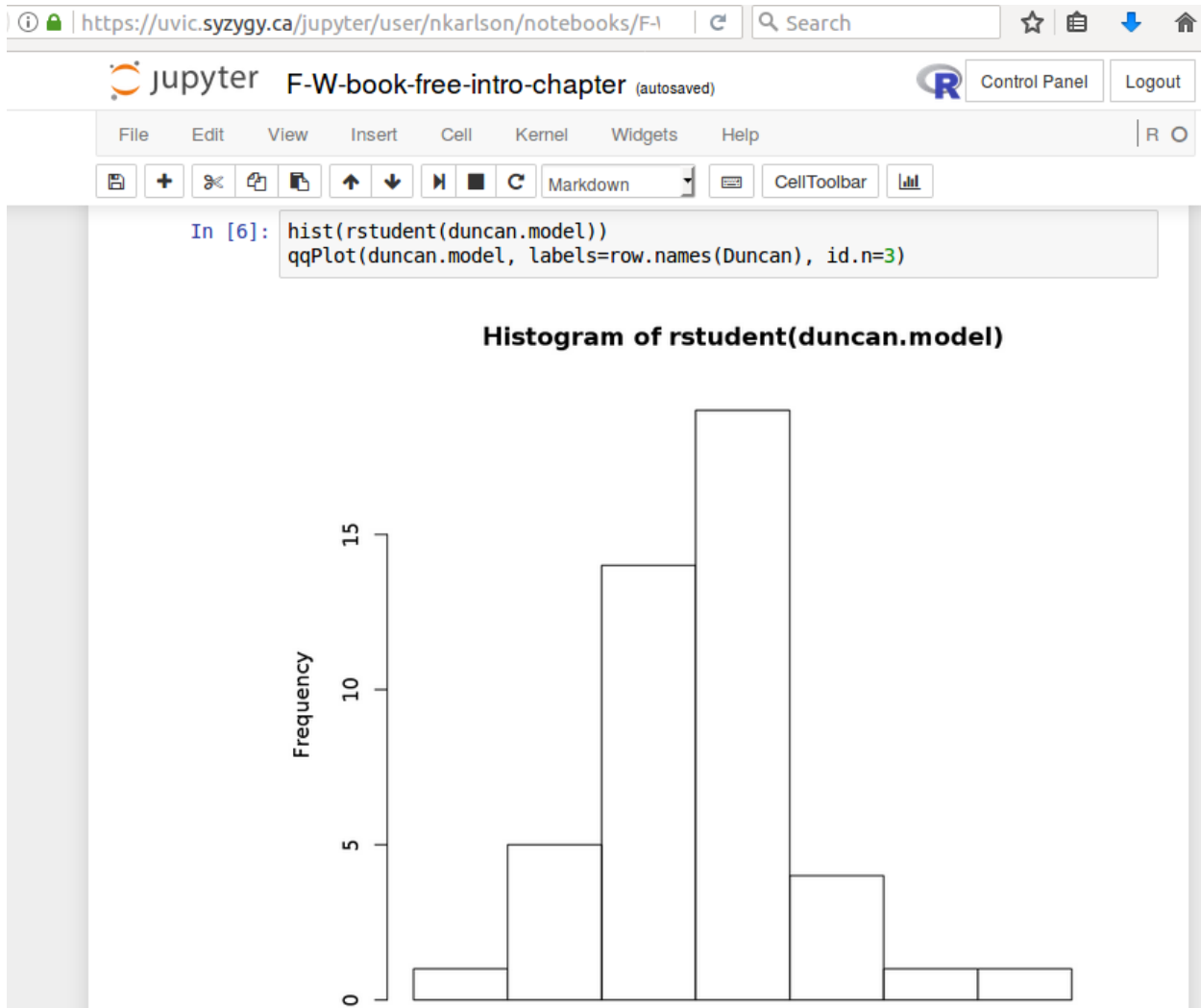
Call:
lm(formula = Duncan\$prestige ~ Duncan\$income + Duncan\$education)

Residuals:
 Min 1Q Median 3Q Max
-29.538 -6.417 0.655 6.605 34.641

Coefficients:
 Estimate Std. Error t value Pr(>|t|)
(Intercept) -6.06466 4.27194 -1.420 0.163
Duncan\$income 0.59873 0.11967 5.003 1.05e-05 ***
Duncan\$education 0.54583 0.09825 5.555 1.73e-06 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 13.37 on 42 degrees of freedom
Multiple R-squared: 0.8282, Adjusted R-squared: 0.82
F-statistic: 101.2 on 2 and 42 DF, p-value: < 2.2e-16



To view a web version of the above (where you can copy and paste into your own Jupyter R notebook) visit:

<https://anaconda.org/esdot/f-w-book-free-intro-chapter>

More hands-on examples...

There are more hands-on examples of basic descriptive statistics, hypothesis tests, and regression if you look at the notebooks available at the following links (where you can copy and paste the code from the example notebook into your own Jupyter R notebook):

<https://anaconda.org/esdot/lab3-econ246>

<https://anaconda.org/esdot/lab4>

<https://anaconda.org/esdot/lab5-econ246-ci>

<https://anaconda.org/esdot/lab8-econ246-2016-nov-14-to-19>

<https://anaconda.org/esdot/lab9-econ246-variance-test>

<https://anaconda.org/esdot/lab10-econ246-nov2016>