Introduction to ImageJ

Measuring Urchins in Photo Plots

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1 Downloading ImageJ

Go to ImageJ (source: https://imagej.net/ij/download.html)

Follow instructions for Mac or Windows. For Macs, you may need to right click to open the downloaded file or it may not be trusted by your machine.

2 Protocol

2.1 Download photo from Box

Go to Box and download your photo plot. (source: https://oregonstate.app.box.com/folder/294649331958)

2.2 Open photo in ImageJ

File and Open and select the phot you want to analyze.

2.3 Set the measurement scale

Select the line tool from the toolbar and draw a line between two points of known distance. In this case, each photo has the quadrat in it. The quadrat is 50cm by 50cm. Draw a line that spans the length of the quadrat. Go to Analyze and Set Scale. In the Set Scale window, type the known distance (50) and the units of measurement (centimeter) in the appropriate boxes and click OK

2.4 Set the measurement to area

Go to Analyze and Set Measurement. In the Set Measurement window, select Area

2.5 Within-text referencing

I can easily reference the section (sect.**??**), equation (eqn. **??**) and table (Table **??**). Their numbers will auto-generate, which makes it easy to move them around in your paper and adhere to a journal's stylistic preferences.

My un-numbered subsection

Sections and subsection are numbered by default, but that can be overwritten for a given section, or globally using `\setcounter{secnumdepth}{0}` in the preamble.

3 More equations

Using align

The Lotka-Voltera equations are given by

$$\frac{dx}{dt} = \alpha x - \beta xy \tag{1}$$

$$\frac{dy}{dt} = \gamma xy - \delta y\,. \tag{2}$$

Often it's useful to typeset the steps of derivations. Pay it forward to folks who are trying to learn these methods, and to yourself when you can't remember the details but have to lecture on it in 5 minutes. In these cases you don't need to number each line.

$$\begin{aligned} N(10) &= \lambda N(9) \\ &= \lambda^2 N(8) \\ &= \lambda^3 N(7) \\ &\dots \\ &= \lambda^{10} N(0)\,. \end{aligned} \tag{3}$$

4 Inserting figures

Note that the position of figures is auto-determined (e.g., Fig. 1)! You can force the position of figures using the `float` package and then the [H] option for your figure (e.g., Fig. 2).

Figure 1: This is the LaTeX logo.

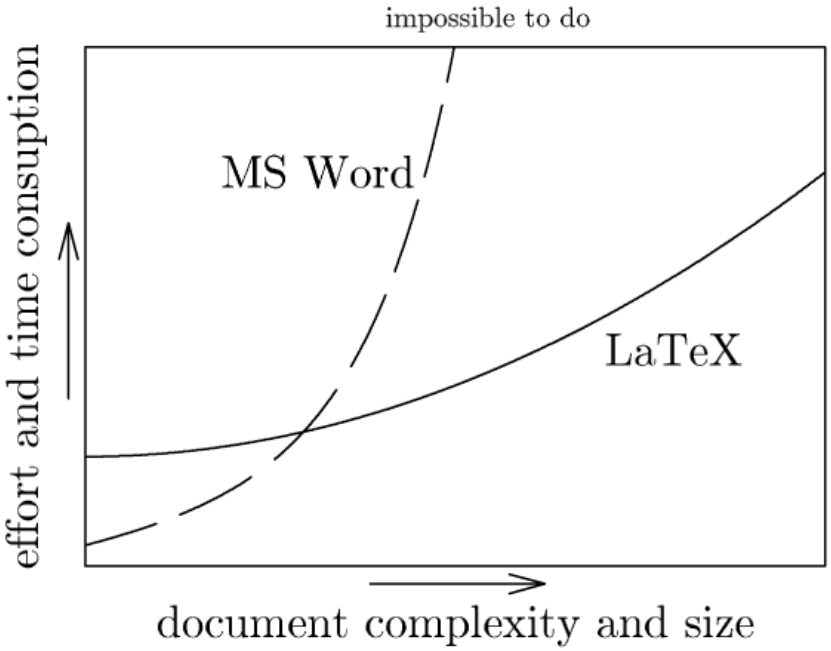

Figure 2: Why use LaTeX (source: http://www.pinteric.com/miktex.html)

5 Inserting external tables

It's relatively easy to use the R `Hmisc` package to generate LaTeX tables (see `../R/ExportTable.R`) and then import them into your document using `input`. Again, just like figures, their placement in the document is auto-determined. If you provided a caption to the tables when generating their tex files in R, it's easy to reference them (Table 1 and 2).

Table 1:

Statistic	N	Mean	St. Dev.	Min	Max
x	6	0.443	0.212	0.191	0.723
y	6	2.024	1.409	−0.083	3.676

Table 2:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.709	0.568	1.247	0.228
x	3.184	1.064	2.991	0.008

6 References

The `natbib` package is great for citing references. Reformatting for a different journal is as easy as changing the arguments of a function. How to cite references and include them in a bibliography is demonstrated in the accompanying `manuscript.tex` template in the parent folder of these lecture notes.

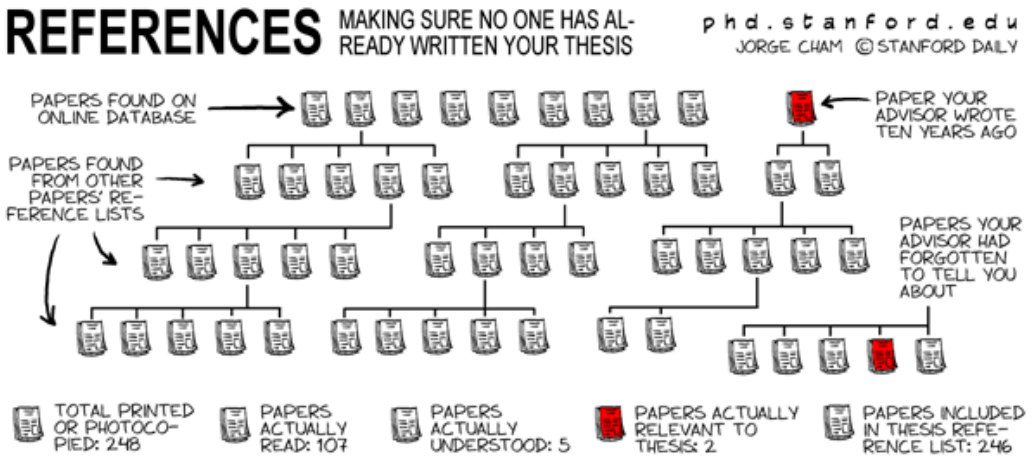

Figure 3: Reading is fundamental (source: http://phdcomics.com/comics/archive.php?comicid=286)