Introduction to LaTeX in LaTeX and Beamer
A few essentials

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Outline

General introduction

Using LATEX

Work flow and LATEX

Caveats

What is LaTeX?

- A document typesetting language for books, reports, articles and presentations
- It is *not* a word processor
- LaTeX is based on the idea that it is better to leave document design to document designers, and to let authors get on with writing documents
- Do you know HTML? Then you already know one document markup language. LaTeX is also one, just with a compiler for PDFs.
- LaTeX is most widely used by mathematicians, economists, engineers, philosophers, lawyers, linguists, researchers, and other scholars in academia

Why use LaTeX?

- It makes very pretty and high resolution presentations
- It makes even more professional looking papers or CVs
- You can concentrate on writing the text and do it in any text editor
- It automates tables of contents, figure/table numbering, footnotes and even references
- STATA can generate tex tables (with simple commands)

Interlude

Definition

The characters T, E, X in the name come from capital Greek letters tau, epsilon, and chi, as the name of TEX derives from the Greek word for skill, art, technique; for this reason, TEX's creator Donald Knuth promotes a pronunciation of (tekh) (that is, with a voiceless velar fricative as in Modern Greek, similar to the last sound of the German word "Bach", the Spanish "j" sound, or as ch in loch).

First steps

- ▸ get a LaTeX distribution like MikTex from `www.miktex.org`
- ▸ get a LaTeX capable editor like WinEdt 6.0 or TeXnicCenter from `www.winedt.com` or `www.texniccenter.org`
- ▸ get a quick PDF viewer that doesn't lock files like Sumatra PDF from `blog.kowalczyk.info/software/sumatrapdf/ free-pdf-reader.html`
- ▸ go to `faculty.gvsu.edu/ogural/` and download these files "LaTeX for Economics (files needed for practice are *here* and *here*) (this is an open source guide; original code, i.e., tex file is *here*)"
- ▸ And check out: `en.wikibooks.org/wiki/LaTeX`

First Document

```
\documentclass{article}
\begin{document}
Hello World! This is my first \LaTeX document.
\end{document}
```

Second Document

```
\documentclass[12pt,a4paper]{article}
\usepackage[bottom]{footmisc}
\title{My title}
\author{Author\thanks{Affiliation}}
\date{\today}
\begin{document}
    \maketitle
    \begin{abstract}
        I'm an environment, I always have a beginning and an end.
    \end{abstract}
\tableofcontents
\pagebreak
    \section{First Section}
        I am section.
        \subsection{First subsection}
        I am a subsection.
\end{document}
```

Document with a 2x4 table: code

In the document body:

```
\begin{table}
  \centering
  \caption{caption1}\label{label1}
  \begin{tabular}{|c c c c|}
    \hline
    % after \\: \hline or \cline{col1-col2} \cline{col3-col4} ...
    1 & 2 & 3 & 4 \\
    5 & 6 & 7 & 8 \\
    \hline
  \end{tabular}
\end{table}
```

Document with a 2x4 table: result

Table: caption1

1	2	3	4
5	6	7	8

Document with a picture: code

In the document body (preferred .EPS, .JPG & .PNG fine too for pdflatex):

```
\begin{figure}
  % Requires \usepackage{graphicx}
  \includegraphics[width=60mm]{weirdo.png}\\
  \caption{I'm a figure}\label{figure1}
\end{figure}
Figure \ref{figure1} above.
```
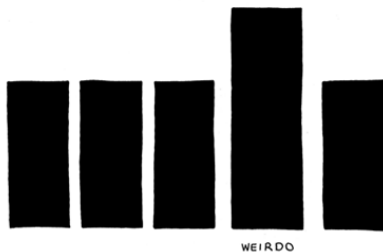
Document with a picture: result

Figure: I'm a figure

Figure 1 above.

Document with Math: the code

```
\documentclass[12pt,a4paper]{article}
\usepackage{amsmath}
\begin{document}
    You can write math in the text like $\alpha^2 \neq \alpha$.
    Or you write it on a new line: $$\sum_{i=1}^{\infty}\frac{1}{x}$$
    Or you write (un)numbered systems of equations:
    \begin{align} % align* for unnumbered
        Y_i = \beta_0 + \beta_1 X_i + u_i \\
        \min_{\beta_0, \beta_1}  \sum\limits_{i=1}^n
        [Y_i - \beta_0 - \beta_1 X_i]^2
    \end{align}
\end{document}
```

Document with Math: the result

You can write math in the text like $\alpha^2 \neq \alpha$. Or you write it on a new line:

$$\sum_{i=1}^{\infty} \frac{1}{x}$$

Or you write (un)numbered systems of equations:

$$Y_i = \beta_0 + \beta_1 X_i + u_i \tag{1}$$

$$\min_{\beta_0, \beta_1} \sum_{i=1}^{n} [Y_i - \beta_0 - \beta_1 X_i]^2 \tag{2}$$

BibTex

BibTex organizes references in LaTeX. Use JabRef software for editing .bib files or do it by hand. It automatically generates and updates references in text and the bibliography. The natbib package allows you to use different citation formats.

```
\usepackage{natbib}
\begin{document}

... As \citet{god10000bc} made it: the sky is blue.

Or: God is dead \citep{nietzsche1890}...

\bibliographystyle{aer} % (AER journal style)
\bibliography{thesis} % (file: thesis.bib)
\end{document}
```

Building a thesis with chapters

In the document body of a meta-file you can just arrange your book and include chapters piece by piece.

```
\documentclass{book}
\title{My title}
\author{Author}
\begin{document}
    \maketitle
    \pagebreak
        \include{acknowledgements}
    \tableofcontents
        \include{chapter_1}
        \include{chapter_2}
        \include{chapter_3}
    \appendix
        \include{appendix_A}
\end{document}
```

Automating STATA and LaTeX: theory

You can use the following STATA packages to generate TeX files, compatible graphics and LaTeX code:

- ► "sutex" generates LaTeX code for summary statistics tables
- ► "outtex" generates LaTeX code for results after any estimation
- ► "outreg" formats regression output for LaTeX
- ► "outtable" automates the conversion of a Stata matrix to a LaTeXtable
- ► "latabstat" is a modification of tabstat which produces LaTeX
- ► "estout" command to export estimation results to LaTeX
- ► "graph2tex" exports graphs into LaTeXhigh-res eps files

Automating STATA and LATEX: practice

Let's do a generic regression in STATA:

```
sysuse auto,clear
regress mpg foreign weight
outreg2 using myfile, tex(frag) replace
```

Let's then switch to your LATEX editor, and assume that we are working in the same directory as the STATA working directory. All we you need to do is to open the paper you are currently writing, scroll to the desired place and:

```
\input{myfile}
```

Now, behold! The magic happens when you go back and add "headroom" to the explanatory variables in STATA. Guess, what will happen? :-)

Caveats

- ▶ Beware, this was a very very introductory introduction to LATEX!!
- ▶ LATEX works with packages like amsmath, graphicx, hyperref etc. – you have to remember what you are using
- ▶ Referencing is done with BibTeX (Google scholar can export BibTex!)
- ▶ LATEX takes a bit to learn, high fixed costs, then easy
- ▶ Presentations are made with Beamer (needs a separate introduction)
- ▶ Beamer takes longer to learn, not made for a very quick presentation
- ▶ It's very useful when working with loads of math and STATA
- ▶ You can write self-updating files STATA/tex files, as in you change your .do-file and your paper changes automatically
- ▶ Lost in LATEX? Check the Wikibook or Google it