

Welcome
to the
CompSoc L^AT_EX Tutorial

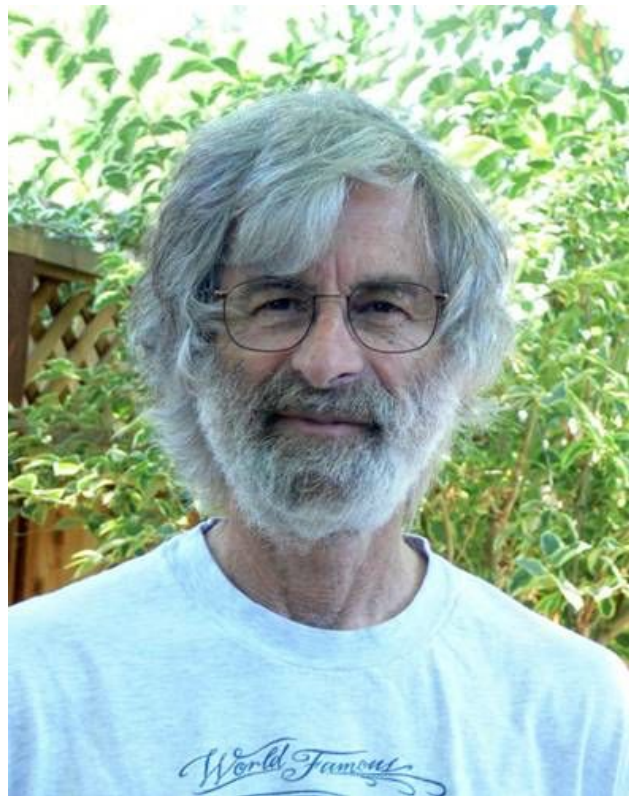
Welcome!

What is L^AT_EX?

Why use it?

OK, so how?

What is L^AT_EX?



Lamport TeX

Leslie Lamport

Donald Knuth



What is L^AT_EX?

Markup Language

Document Processor

~~WYSIWYG~~

WYMIWYG

Why should I use it?

TeX math mode is a thing of beauty. Equations come out looking correct. Mathematical expressions in Word are treated as an afterthought. Equation editor is evil.

– *Kent Lundberg, MIT*

Document1

Search in Document

Home Insert Design Layout References Mailings Review View Equation

π Professional Linear abc Normal Text

\pm ∞ $=$ \neq \sim \times \div $!$ α $<$ \ll $>$ \gg \leq

\geq \mp \equiv \approx \equiv \forall \complement ∂ $\sqrt{}$ $\sqrt[3]{}$ $\sqrt[4]{}$ u n \emptyset

$\frac{x}{y}$ e^x $\sqrt[n]{x}$ \int_{-x}^x $\sum_{i=0}^n$ $\{()\}$ Bracket $\lim_{n \rightarrow \infty}$ Limit and Log $\sin \theta$ Function Δ Operator \ddot{a} Accent $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ Matrix

$$\bar{x} = \frac{1}{} \sum_{i=1}^n x_i$$

Page 1 of 1 2 Words English 500%

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

`\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i`

Why should I use it?

Academic
Standard

Consistent styling

Diagrams

Stability

Cross-referencing

Bibliography

Packages

Free

Math

Ready-made styles

Table of Contents

Modularity

Plain-text format

Proper Typography

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Modularity

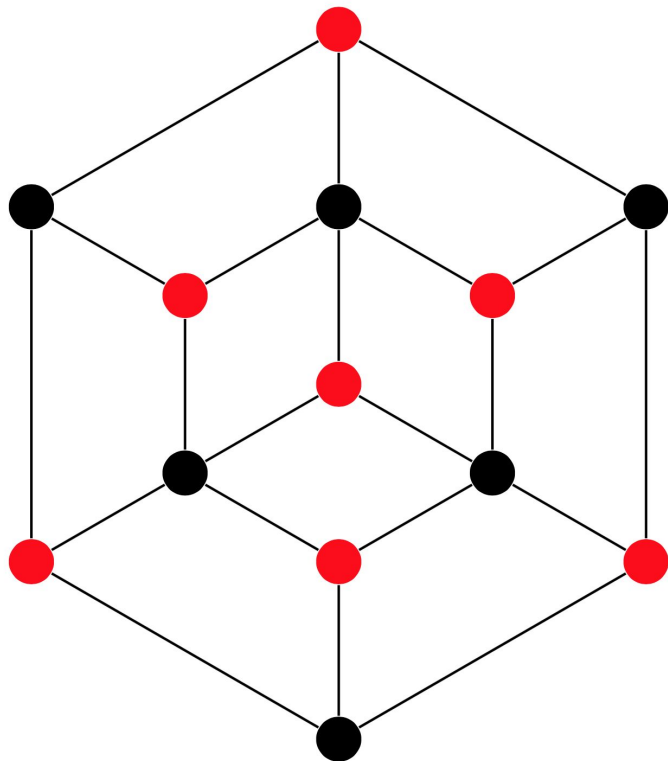
Proper Typography

Plain-text format

It's So Pretty!

Bibliography

Examples



$$A = \begin{bmatrix} 5 & -1 \\ 2 & 2 \end{bmatrix}$$

$$P_A(\lambda) = \det(A - \lambda I)$$

$$= \det \left(\begin{bmatrix} 5 - \lambda & -1 \\ 2 & 2 - \lambda \end{bmatrix} \right)$$

$$= (5 - \lambda)(2 - \lambda) + 2$$

$$0 = 10 - 7\lambda + \lambda^2 + 2$$

$$= \lambda^2 - 7\lambda + 12$$

$$= (\lambda - 3)(\lambda - 4)$$

$$\therefore \lambda = 3, \lambda = 4$$

Examples



Le premier liure de Moyse, Dict Genesé.



ARGUMENT.

Ce premier liure comprend l'origine & cause de toutes choses, principalement la creation de l'homme, qu'il a esté du consentement, & de la divine & résoluement : comment & par quel moyen, & pour leurs crimes pechie Dieu les a conjoints, par le deluge, referé baillé, dont la jenneté a rempli toute la terre. Puis il descript les vies, faicts, religion, & lignées des saints Patriarches, qui ont esté devant la Loy : Les benedictions, promesses, & alliances du Seigneur faictes avec eux : Comment de la terre de Chanaan sont descendus en Egypte. Aucuns ont appelé ce liure, le liure des Hebreux. Enquies c'est a dire entre ses predecesseurs & nous, qu'il est appelé Genesé, que est en mot Grec, signifiant generation & origine : d'autant qu'en icelui est descripte l'origine & procreation de toutes choses : & nommément des Peres anciens, qui ont esté tant devant qu'après le deluge, & en esgard à JESUS CHRIST descendu d'iceux selon la chair.

CHAPITRE I.

Creation du ciel & de la terre, II, 10, & de tout ce qui y est compris, 3, 4. De la lumiere engie, 5, 6 & de l'homme, 18. Anquel tout est asubietti. 2, 2. 18 Dieu benit toutes ses creatures, 31 qu'il a accomplies en six iours.

¹Ce premier chapitre est si ditte elle : de pour une cause, d'autant qu'il fonde entre les Hebreux de la fin de l'interpréter devant l'age de terre.

²En de rien, de sans aucun commencement.

³En de rien, de sans aucun commencement.

⁴En de rien, de sans aucun commencement.

⁵En de rien, de sans aucun commencement.

⁶En de rien, de sans aucun commencement.

⁷En de rien, de sans aucun commencement.



Dieu crea le ciel & la terre.

Or la terre estoit sans forme, & voidue, & les tenebres estoient sur les abysses : & l'Esprit de Dieu estoit epandu par dessus les eaux.

- Adonc Dieu dit, 'Qu'il y ait lumiere, & la lumiere fut.
- Et Dieu vid q la lumiere estoit benne : & lepara la lumiere des tenebres.
- Et Dieu appela la lumiere iour, & les tenebres nuit. Lors fut fait le soir & le matin du premier iour.
- Puis Dieu dit, 'Qu'il y ait une estendue entre les eaux, & quelle lepare les eaux d'avec les eaux.
- Dieu donc fit l'estendue, & diuisa

les eaux, qui estoient sous l'estendue, d'avec celles, qui estoient sur l'estendue. Et fut ainsi fait.

Et Dieu appela l'estendue, Ciel. Lors fut fait le soir & le matin du second iour.

Puis Dieu dit, 'Que les eaux, qui sont sous le ciel, soyent assemblees en un lieu, & que le sec apparaisse. Et fut ainsi fait.

Et Dieu appellee sec, Terre, & l'assemblee des eaux, mers. Et Dieu vid que cela estoit bon.

Et Dieu dit, Que la terre produise verdure, herbe produisant semence, & arbre fruitier, faisant fruit selon son espece, lequel ait sa semence en soy-mesme sur la terre. Et fut ainsi fait.

La terre donc produisit verdure, herbe produisant semence selon son espece, & arbre sans fruit, lequel avoit sa semence en soy-mesme selon son espece. Et Dieu vid que cela estoit bon.

Lors fut fait le soir & le matin du troisieme iour.

Après Dieu dit, 'Qu'il y ait luminaires en l'estendue du ciel, pour separer la nuit du iour : & soyent en signes,

pour que les Hebreux observent le jour naturel le jour apres le soleil couchant.

Ce mot d'Estue, complet tout ce qui se voit par dessus nous, c'est en la region celeste, quelquement.

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Ce mot d'Estue, complet tout ce qui se voit par dessus nous, c'est en la region celeste, quelquement.

a en

How do I get started?

Here is what you'll need:

- L^AT_EX on your computer
 - All Platforms → ○ <http://www.tug.org/texlive/>
 - Windows Only → ○ <http://www.miktex.org/>
- A (plain) text editor, or a TeX IDE
 - We'll be mostly editor-agnostic
 - WinEDT is a good choice tonight
 - TeXStudio, TeXShop Sublime, Notepad++...
- Or use a cloud-based service
 - ShareLaTeX (what I use), Overleaf

That's it!

```
1. \documentclass[a4paper]{article}
2.
3. \begin{document}
4.
5. \LaTeX{} ipsum dolor sit amet,
6. consectetur adipisicing elit, sed
7. do eiusmod tempor incididunt ut
8. labore et dolore magna aliqua.
9.
10. \end{document}
```


In WinEDT:

TeX > PDF > PDFLaTeX

In Command Prompt:

`pdflatex filename.tex`

In others...

Search the menus, or just use Command Prompt

1. `\usepackage{amsmath}`
2. `\usepackage{amssymb}`
3. `\usepackage{amsthm}`
4. `\usepackage{graphicx}`
5. `\usepackage{hyperref}`
6. `\usepackage{enumitem}`
7. `\usepackage{acro}`
8. `\usepackage[number,square]{natbib}`

1. `\title{Document Title}`
2. `\date{10/03/2016}`
3. `\author{Your Name}`
- 4.
5. `\begin{document}`
6. `\maketitle`

1. `\section{The big idea}`
2. `\subsection{A smaller idea}`
- 3.
4. `\textbf{Something bold.}`
5. `\emph{Something skew.}`
- 6.
7. A bit of `quoted' text \\
8. forced onto two lines.

Document Title

Your Name

10/03/2016

1 The big idea

1.1 A smaller idea

Something bold. *Something skew.*

A bit of ‘quoted’ text
forced onto two lines.

1. I can write symbols like α .

I can write symbols like α .

1. `\begin{align}`
2. `y - y_1 &= m(x - x_1) \\`
3. `y &= mx + c \nonumber`
4. `\end{align}`

$$y - y_1 = m(x - x_1)$$

$$y = mx + c$$

1. `\begin{align*}`
2. `y &= ax^2 + bx + c \\`
3. `&\text{where } a, b, c`
4. `\in \mathbb{R}`
5. `\end{align*}`

$$y = ax^2 + bx + c$$

where $a, b, c \in \mathbb{R}$

1. `\newcommand{\reals}[0]{`
2. `\ensuremath{\mathbb{R}}}}`

1. `\begin{align*}`
2. `y &= ax^2 + bx + c \\`
3. `&\text{where } a, b, c`
4. `\in \reals`
5. `\end{align*}`

$$y = ax^2 + bx + c$$

where $a, b, c \in \mathbb{R}$

```
1. \begin{equation}
2.     \frac{1}{3} \times 2
3.     = \sqrt[3]{8} \div 3
   \end{equation}
```

$$\frac{1}{3} \times 2 = \sqrt[3]{8} \div 3$$

1. `\begin{equation*}`
2. `\bar{x} = \frac{1}{n}`
3. `\sum_{i=1}^n x_i`
4. `\end{equation*}`

```
1. \begin{itemize}
2.   \item
3.     The first item in my list.
4.     \begin{enumerate}[label=\roman*)]
5.       \item Nested
6.       \item Lists
7.     \end{enumerate}
8.   \item
9.     The second item.
10. \end{itemize}
```

1. `\begin{figure}`
- 2.
3. `\includegraphics{your_image}`
- 4.
5. `\end{figure}`
- 6.
- 7.

1. `\begin{figure}`
- 2.
3. `\includegraphics{your_image}`
4. `\caption{Words}`
5. `\end{figure}`
- 6.
- 7.

1. `\begin{figure}`
2. `\centering`
3. `\includegraphics{your_image}`
4. `\caption{Words}`
5. `\end{figure}`
- 6.
- 7.

1. `\begin{figure}`
2. `\centering`
3. `\includegraphics{your_image}`
4. `\caption{\label{fig:pic}Words}`
5. `\end{figure}`
- 6.
- 7.

1. `\begin{figure}`
2. `\centering`
3. `\includegraphics{your_image}`
4. `\caption{\label{fig:pic}Words}`
5. `\end{figure}`
- 6.
7. Referencing Figure~`\ref{fig:pic}`.

```
1. \begin{table}
2.     \centering
3.     \begin{tabular}{c c}
4.         $p$ & $\lnot p$ \\
5.         \hline
6.         1 & 0 \\
7.         0 & 1
8.     \end{tabular}
9. \end{table}
```

1. `\begin{document}`
2. As mentioned by
3. `\citeauthor{key}~\cite{key},`
4. blah blah blah
- 5.
6. `\bibliographystyle{plainnat}`
7. `\bibliography{file.bib}`
8. `\end{document}`

1. `\DeclareAcronym{KF}{`
2. `short=KF,long=Kalman Filter}`
3. `\begin{document}`
4. `\Acp{KF} are cool. Use a`
5. `\ac{KF} for Machine Learning.`
6. `\end{document}`

Kalman Filters (KFs) are cool. Use a KF for Machine Learning.

`tex.stackexchange.com`
`en.wikibooks.org/wiki/LaTeX`
`Detexify.kirelabs.org`
`truben.no/latex/table`
`latextemplates.com`



Extras

Extras

Inserting Code


```
1. \usepackage[procnames]{listings}
2.
3. \lstset{language=Python,
4.         basicstyle=\ttfamily}
5. ...
6. \lstinputlisting[caption=Words]
7.     {"filename.ext"}
```

Extras

Drawing Pictures

```
1. \usepackage{tikz}
2. \usetikzlibrary{shapes}
3. ...
4. \begin{tikzpicture}
5.     \tikzstyle{every node} =
6.         [circle,fill=black]
7.     \node (n1) at (0, 1) {};
8.     \node (n2) at (1, 1) {};
9.     \draw (n1) -- (n2);
10. \end{tikzpicture}
```

Extras

Posters

You've probably
seen them around
UC. They use the
a0poster
document class.

Expression Invariant Face Recognition using a 3D Morphable Model

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Contribution

We introduce a method for expression invariant face recognition. A generative 3D Morphable Model (3DMM) is used to separate identity and expression components. The expression removal results in greatly increased recognition performance, even on difficult datasets, without a decrease in performance on expression-less datasets. It is applicable to any kind of input data, and was evaluated here on textureless range scans.

Model

The Model was learnt from 175 subjects. We used one neutral expression scan per identity and 50 expression scans of a subset of the subjects. The identity model is a linear model build from the neutral scans.

$$f = \mu + M_i \alpha_i \quad (1)$$

For each of the 50 expression scans, we calculated an expression vector as the difference between the expression scan and the corresponding neutral scan of that subject. This data is already mode-centered, if we regard the neutral expression as the natural mode of expression data. From these offset vectors an additional expression matrix M_e was calculated, such that the complete linear Model is

$$f = \mu + M_i \alpha_i + M_e \alpha_e \quad (2)$$

The assumption here is, that the face and expression space are linearly independent, such that each face is represented by a unique set of coefficients.

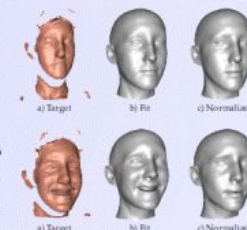
Fitting

A Robust Nontigid ICP method was used to fit the model to the data. Robustness was achieved by iteratively reweighting the correspondences and using hard compatibility test for the closest points. Fitting was initialized by a simple nose detector and proceeded fully automatic.

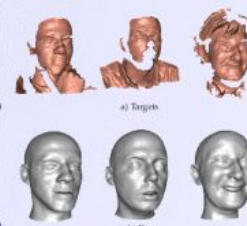
Distance Measure

The Mahalanobis angle between the identity coefficients α_i was used for classification.

Expression Neutralization



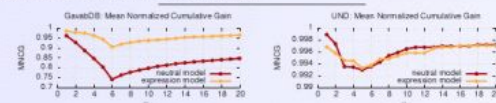
Robustness



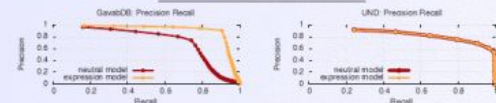
The reconstruction (b) is robust against scans (a) with artifacts, noise, and holes.

Results

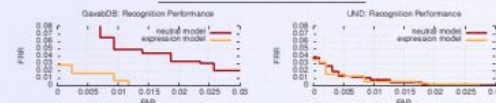
The method was evaluated on the GavabDB expression dataset which contains 427 Scans, with 3 neutral scans and 4 expression scans per ID. To test the impact of expression invariance on neutral data we used the UND Dataset from the Face Recognition Great Vendor Test, which contains 953 neutral scans with one to eight scans per subject.



Expression neutralization improves results on the expression dataset without decreasing the accuracy on the neutral testset. Plotted is the ratio of correct answers to the number of possible correct answers.



Plotted are precision and recall for different retrieval depths. The lower precision of the UND database is due to the fact that some queries have no correct answers.



Impostor detection is reliable, as the minimum distance to a match is smaller than the minimum distance to a nonmatch.

Open Questions

While the expression and identity space are linearly independent, there is some expression left in the identity model. This is because a "neutral" face is interpreted differently by the subjects. We investigate the possibility to build an identity/expression separated model without using the data labelling, based on a measure of independence.

References

- [1] B. Amberg, S. Busschorn, T. Vetter: Optimal-Step Nontigid ICP Algorithms for Surface Registration. In CVPR 2007.
- [2] B. Amberg, R. Kneib, T. Vetter: Expression Invariant Face Recognition with a 3D Morphable Model. In APGC 2008.

Funding

This work was supported in part by Microsoft Research through the European PhD Scholarship Programme.

<http://tug.org/pracjourn/2008-3/morales/morales.pdf>

Extras

Beamer Presentations

Beamer Presentations

- This is LaTeX for presentations.
- You will see this while you're at UC, almost guaranteed.
- By default it's not much to look at...
- ... but it can be made prettier.