

# LaTeX Workshop

Ali Ekramian

[ali-ekramian.github.io](https://ali-ekramian.github.io)

October 2, 2025

# Contents

<b>1</b>	<b>Introduction</b>	<b>3</b>
1.1	Why LaTeX? . . . . .	3
1.2	File Types . . . . .	3
<b>2</b>	<b>Basic Typesetting</b>	<b>3</b>
2.1	Writing Texts . . . . .	3
2.1.1	Paragraphs . . . . .	3
2.1.2	Text Formatting . . . . .	3
2.1.3	Fonts . . . . .	4
2.1.4	Colours . . . . .	4
2.1.5	Characters . . . . .	4
2.2	Lists . . . . .	4
2.2.1	Itemize . . . . .	4
2.2.2	Enumerate . . . . .	4
2.2.3	Description . . . . .	4
<b>3</b>	<b>Mathematics</b>	<b>5</b>
3.1	Inline . . . . .	5
3.1.1	Align . . . . .	5
3.2	Matrix . . . . .	5
3.3	Physics package . . . . .	6
<b>4</b>	<b>Figures</b>	<b>6</b>
4.1	Text Spacing . . . . .	6
4.2	Figure Environment . . . . .	7
4.3	Multiple Images . . . . .	7
4.4	Image in Paragraphs . . . . .	7
<b>5</b>	<b>Referencing</b>	<b>7</b>
5.1	Out Side . . . . .	8
5.2	Internal . . . . .	8
5.3	Articles & Books . . . . .	8
<b>6</b>	<b>Table</b>	<b>8</b>
6.1	Table Environment . . . . .	8
<b>7</b>	<b>Multi File</b>	<b>8</b>
<b>8</b>	<b>Geometry</b>	<b>9</b>
<b>9</b>	<b>Header &amp; Footer</b>	<b>9</b>

# 1 Introduction

This is the first time I'm using L<sup>A</sup>T<sub>E</sub>X.

## 1.1 Why LaTeX?

Because it's a professional typesetting system.

## 1.2 File Types

Example: .tex and .pdf

# 2 Basic Typesetting

We want to start learning LaTeX.

## 2.1 Writing Texts

First sentence. Second sentence.

Third sentence.

Forth sentence.      Fifth sentence      six

### 2.1.1 Paragraphs

LaTeX was created in the early 1980s by Leslie Lamport when he was working at Stanford Research Institute (SRI). He needed to write TeX macros for his own use and thought that with a little extra effort, he could make a general package usable by others.

LaTeX was created in the early 1980s by Leslie Lamport when he was working at Stanford<sup>1</sup> Research Institute<sup>2</sup>. He needed to write TeX macros for his own use and thought that with a little extra effort, he could make a general package usable by others.

### 2.1.2 Text Formatting

This **word** is **bold**. This *word* is in italic.

This is a code

Not *Italic*      underline

---

<sup>1</sup>This is a footnote

<sup>2</sup>SRI

### 2.1.3 Fonts

large word    LARGE    Huge word

tiny word

Serif Fonts

### 2.1.4 Colours

This word is Red. To highlight we can use this.

### 2.1.5 Characters

how to type special characters like % and & and \$ not @ ! >

## 2.2 Lists

We have some environments:

### 2.2.1 Itemize

Itemize environments:

- First Item
- Second Item
- ! Third Item
- blanc

### 2.2.2 Enumerate

Enumerate environment:

1. First Item
2. Second Item
5. Third Item
  - (a) First Item
  - (b) Second Item
    - i. First Item
    - ii. Second Item

### 2.2.3 Description

**First word** a long description 1

**Second word** a long description 2

### 3 Mathematics

We can easily write math equations in L<sup>A</sup>T<sub>E</sub>X.

#### 3.1 Inline

we have  $a^2 + b = c \times c$  in math. We know that  $\sqrt[3]{2} \in \mathbb{R}$  text  $x^2$  is a number. math cal:  $\mathcal{H}$

$$a_1 = \frac{v^2}{r} \quad (1)$$

$$\begin{aligned} A &= \pi r^2 \\ &= \pi(a^2 + b^2) \end{aligned} \quad (2)$$

Functions:

$$\sin \theta = \tan(\alpha) = \log \Omega = \omega$$

Accents:

$$\ddot{\vec{r}} = \dot{\vec{v}} = a_x \hat{x} + a_y \hat{y} = v' = \tilde{a} \quad \forall i \in \mathcal{A}$$

##### 3.1.1 Align

$$f(y) = \int f(x, y) dx \quad (3)$$

$$= \int_1^2 xy dx \quad (4)$$

$$= y \left[ \frac{x^2}{2} \right]_1^2 \quad (5)$$

this is an equation:

$$\int_{-\infty}^{+\infty} e^{-x^2} dx = \sqrt{\pi}$$

sum and limits:

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} \quad , \quad \lim_{x \rightarrow 0^+} f(x)$$

diff eq:

$$x'' + bx = 0 \quad , \quad \ddot{x} + \omega^2 x = 0$$

derivatives:

$$\frac{df(x)}{dx} + u(x) \frac{d^2 f(x)}{dx^2} = 0 \quad , \quad \frac{\partial^2 f(x, y)}{\partial x^2} = \frac{\partial^2 f(x, y)}{\partial y^2}$$

#### 3.2 Matrix

usual math environment:

$$\begin{pmatrix} a & b & c \\ d & e & f \end{pmatrix}^T$$

Ali Ekramian

3.3   Physics package

matrix with this package:

$$\begin{bmatrix} a & b & c \\ d & e & f \end{bmatrix}^2 = \begin{pmatrix} a & b & c \\ d & e & f \end{pmatrix}$$
$$\det \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$

derivatives:

$$\frac{\mathrm{d}^2 f(x)}{\mathrm{d} x^2} = \frac{\partial^2 f(x)}{\partial x^2}$$

integral:

$$\int f(x) \, \mathrm{d} x \quad \iint f(x,y) \, \mathrm{d} x \, \mathrm{d} y \quad \iiint f(x,y,z) \, \mathrm{d} x \, \mathrm{d} y \, \mathrm{d} z \quad \oint_C g(q) \mathrm{d} q$$
$$*\bigcap \phi \psi \quad \Delta x \quad \delta x$$
$$\rightarrow \Rightarrow \quad \text{EQ.1} \stackrel{x \neq y}{\Rightarrow} \text{EQ.2} \quad \exists i \in \mathcal{B}$$

4   Figures

How to input pictures

4.1   Text Spacing

			Right Word
	center word		
Left word			
First			Last
First	Center		Last



## 4.2 Figure Environment

LaTeX was created in the early 1980s by Leslie Lamport when he was working at Stanford Research Institute (SRI). He needed to write TeX macros for his own use and thought that with a little extra effort, he could make a general package usable by others.



Figure 1: LaTeX picture

LaTeX was created in the early 1980s by Leslie Lamport when he was working at Stanford Research Institute (SRI). He needed to write TeX macros for his own use and thought that with a little extra effort, he could make a general package usable by others.

## 4.3 Multiple Images



(a) LaTeX picture 1



(b) LaTeX picture 2

## 4.4 Image in Paragraphs

LaTeX was created in the early 1980s by Leslie Lamport when he was working at Stanford Research Institute (SRI). He needed to write TeX macros for his own use and thought that with a little extra effort, he could make a general package usable by others.

LaTeX was created in the early 1980s by Leslie Lamport when he was working at Stanford Research Institute (SRI). He needed to write TeX macros for his own use and thought that with a little extra effort, he could make a general package usable by others.



## 5 Referencing

Package we use: `hyperref`

## 5.1 Out Side

My personal website is [This Website](#).

My Email is [This E-Mail](#).

My personal website was <https://ali-ekramian.github.io>.

This is the image [IMAGE](#).

## 5.2 Internal

This was our image [1](#).

This was the equation No.([5](#))

$$A\mathbf{v} = \lambda\mathbf{v} \quad (\text{law})$$

This is the [law](#).

## 5.3 Articles & Books

The equations are shown in article [\[1\]](#) and the pictures were in article [\[2\]](#).

# 6 Table

Simple table:

Product	Cost	N
A	20	100
B	15	150
C	12	600

## 6.1 Table Environment

Another table in Table Environment:

Product	Cost	N
A	20	100
B	15	150
C	12	600

Table 1: Table Products and Costs

# 7 Multi File

This is a subfile.

$$x^2 + x = ab$$

This is a subfile.

$$x^2 + x = ab$$



## 8 Geometry

Do this:

```
\usepackage[a4paper, top=3cm, bottom=3.5cm, left=3cm, right=3cm]{geometry}
```

## 9 Header & Footer

Do this:

```
\usepackage{fancyhdr}
```

```
\pagestyle{fancy}
```

```
\fancyhf{}
```

```
\fancyhead[L]{\leftmark}
```

```
\fancyhead[C]{LaTeX Workshop}
```

```
\fancyhead[R]{\thepage}
```

```
\fancyfoot[C]{Ali Ekramian}
```

## References

- [1] Ali Ekramian. Latex workshop 1. *Journal 1*, 2025.
- [2] Ali Ekramian. Latex workshop 2. *Journal 2*, 2026.