LaTeX 2_ε Introduction *

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*For anyone who is interested in Latex

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[1]sample_footnote_1

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Abstract

You can learn very basics of using LaTeX 2_ε as well as some advanced mathematical applications.

1 Basics

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1.1 Pages

New page

1.2 Lines

Going off the right edge of the paper → These strings and numbers (21312903) will be grouped toget
'New line'
"New line"

1.3 Hyphenation

Single-hyphenation
Double–hyphenation
Triple—hyphenation
Minus sign: −1

1.4 Internet links

https://github.com/kwb425/Latex_Introduction_TeXShop

1.5 End of sentences

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Sentence end with CAPITALS. Next Sentence...

1.6 Cross-reference

1.6 on page 3

1.7 Footnotes[2]

footnote[3]

1.8 Emphasizing

Three methods are **bold**, *italic*, and underline.

[2] sample_footnote_1
[3] sample_footnote_2

1.9 Alignment

center alignment

left alignment

right alignment

1.10 Enumerates & Items & Descriptions

1. Sample_enumerate_1
   - Sample_item_1
   - Sample_item_2
2. Sample_enumerate_2

   Sample_description_1 is a sample.

1.11 Quatation

Below is sample quatation.

> This sample is written by Kim, Wiback

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1.12 Raw printing

```
Raw printing /~!@#$%^&*()_+
```

1.13 Tables

1st row	bound	1st sample	bound	1st sample
2nd row	bound	2nd sample	bound	2nd sample
3rd row	bound	3rd sample	bound	3rd sample

Pi	bound	Value & Rounding		
π	bound	3.1416	bound	3
π^{π}	bound	36.46	bound	36
$(\pi^{\pi})^{\pi}$	bound	80662.7	bound	80663

1.14 Floats

2 Mathematical equations

2.1 Inline equations

$a^x + y \neq a^{x+y}$

$\lim_{n\to\infty} \sum_{k=1}^{n} \frac{1}{k^2} = \frac{\pi^2}{6}$

2.2 New paragraphic equations

$$\lim_{n\to\infty} \sum_{k=1}^{n} \frac{1}{k^2} = \frac{\pi^2}{6}$$

2.3 Cross-reference

$$\epsilon > 0 \tag{1}$$

From (1), ...

2.4 Texts in mathematical equations

Without texts:

$$\forall x \in \mathbf{R}: \qquad x^2 \geq 0 \tag{2}$$

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With texts:

$$x^2 \geq 0 \qquad \text{for all } x \in \mathbf{R} \tag{3}$$

2.5 Greeks

Lowers: $\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta, \iota, \kappa, \lambda, \mu, \nu, \xi, o, \pi, \rho, \sigma, \tau, \upsilon, \phi, \chi, \psi, \omega$
Uppers: $A, B, \Gamma, \Delta, E, Z, H, \Theta, I, K, \Lambda, M, N, \Xi, O, \Pi, P, \Sigma, T, \Upsilon, \Phi, X, \Psi, \Omega$

2.6 Roots

$\sqrt[3]{x} \qquad \sqrt[4]{x^2 + \sqrt[2]{y}} \qquad \sqrt[3]{2}$

2.7 Braces

$\overline{x+y} \qquad \underline{x+y} \qquad \underbrace{x+y+\cdots+z}_{26} \qquad \overbrace{x+y+\cdots+z}^{26}$

2.8 Vectors

$$\vec{a} \quad \overrightarrow{AB}$$

2.9 Derivatives & Integrals & Summations & Products

Four processes.

Derivatives:

$$y = x^2 \qquad y' = 2 \cdot x \qquad y'' = 2 \qquad \frac{\partial f(x)}{\partial x} = \frac{\partial g(x)}{\partial y}$$

Integrals:

$$\int_{-\infty}^{\infty} \mathrm{d}x\, \mathrm{d}y \iiint_{-\infty}^{\infty} \mathrm{d}x\, \mathrm{d}y$$

summations:

$$\sum_{\substack{0<x<n \\ 1<y<m}} P(x,y) = \sum_{\substack{x \in I \\ 1<y<m}} Q(x,y)$$

products:

$$\prod_{\epsilon}^{\infty}$$

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2.10 Functions

Example among many functions (cos, sin, exp, ...):

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

2.11 Fractions

$$\frac{x^2}{k+1} \qquad x^{\frac{2}{k+1}} \qquad x^{1/2}$$

2.12 Binomials

$$\binom{n}{k} \qquad \mathrm{C}_n^k$$

2.13 Brackets

Two ways of dealing with the brackets

Automatic sizings:

$$[a,b,c] \equiv [a,b,c]\left[\frac{1}{1-x^2}\right]^3 \qquad (a,b,c) \equiv (a,b,c)\left(\frac{1}{1-x^2}\right)^3 \qquad a,b,c \neq \{a,b,c\}\left\{\frac{1}{1-x^2}\right\}^3$$

Self sizings:

$$\Big((x+1)\cdot(x-1)\Big)^2 \qquad \Big(\Big(\Big(\Big(\quad\Big\}\Big\}\Big\{\Big\{$$

2.14 Arrays

Three forms.

Full matrix form:

$$\mathbf{X} = \begin{pmatrix} x_{11} & x_{12} & \dots \\ x_{21} & x_{22} & \dots \\ \vdots & \vdots & \ddots \end{pmatrix}$$

Half matrix form:

$$y = \begin{cases} a & \text{if } \textit{good} \\ b+c & \text{well...} \\ l & \text{good for you?} \end{cases}$$

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Separated form:

$$\left(\begin{array}{c|c} 1 & 2 \\ \hline 3 & 4 \end{array}\right)$$

2.15 Multilines

$$f(x) = \cos x \tag{4}$$

$$f'(x) = -\sin x \tag{5}$$

$$\int_0^x f(y)dy \quad = \quad \sin x \tag{6}$$

2.16 Advanced alignment with amsmath package

Total five environments.

Equation environment:

$$e^{\pi i} - 1 = 0 \tag{7}$$

Split environment:

$$\begin{aligned} A &= \frac{\pi r^2}{2} \\ &= \frac{1}{2}\pi r^2 \end{aligned} \tag{8}$$

Multiline environment:

$$p(x) = 3x^6 + 19x^3y^3$$

$$\begin{aligned} p(x) &= 3x^6 + 19x^3y^3 \\ p(x) &= 3x^6 + 19x^3y^3 \end{aligned}$$

$$p(x) = 3x^6 + 19x^3y^3$$

Gather environment:

$$\begin{gathered} 2x - 5y = 8 \\ 3x^2 + 9y = 1 \end{gathered}$$

Align environment:

$$\begin{aligned} x &= y & w &= z & a &= b + c \\ 2x &= -y & 3w &= \frac{1}{2}z & a &= b \\ -4 + 5x &= 2 + y & w + 2 &= -1 + w & ab &= cb \end{aligned}$$

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2.17 Delicate space control

$$\Gamma_{xy}{}^{z} \qquad \text{vs} \qquad \Gamma^{z}_{xy}$$

2.18 Bold in equations

$$\mu, M \qquad \boldsymbol{\mu}, \boldsymbol{M}$$

2.19 Encapsulated PostScript, .eps

Figure 1: Upper caption

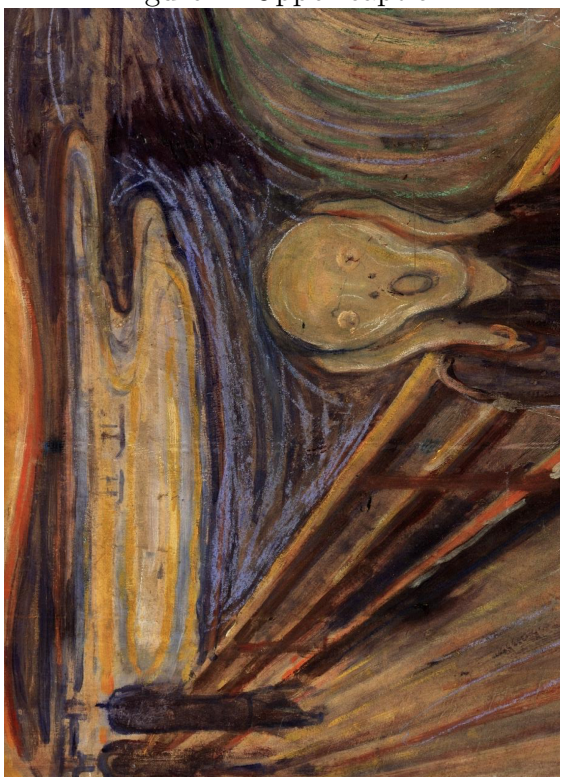

Figure 2: Bottom caption

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2.20 References

Kim [1] has proposed that ...

References

[1] Kim: *Korea*, Introduction to LaTeX 2_ε (2016)

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