LaTeX for Students, Engineers, and Scientists

Firuza Karmali
Nagesh Karmali

Department of Computer Science and Engineering
IIT Bombay

Session: Mathematics - I

You will learn to ...

- Typeset simple mathematical expressions and fractions

Overview

- Simple Maths: No expressions
- Complex ones: amsmath or mathtools
- Written in between: $ ... $ or \[... \]

Simple Maths

- $2^2 + 2^2 = 4$

  ```
  $2^2 + 2^2 = 4$
  ```

- $\sqrt[4]{4096} = 8$

  ```
  $\sqrt[4]{4096} = 8$
  ```

- $e^{x+iy} = e^x(\cos y + i \sin y)$

  ```
  $ e^{x+iy} = e^x(\cos y + i \sin y) $
  ```

- $A \cup B = n(A) + n(B) - n(A \cap B)$

  ```
  $ A \cup B = n(A) + n(B) - n(A \cap B) $
  ```

Symbols

- The Comprehensive LaTeX Symbol List.
  `http://tug.ctan.org/info/symbols/comprehensive/symbols-a4.pdf`
- Finding unknown symbol
  `http://detexify.kirelabs.org/classify.html`

Fractions

- `\frac{numerator}{denominator}`
- $\frac{2}{3}$ `\frac{2}{3}`
- $\frac{8}{\frac{1}{3}} = 8 \times \frac{3}{1}$
  `$\frac{8}{\frac{1}{3}} = 8 \times \frac{3}{1}$`
- $\frac{a}{b} \geq \frac{c}{d}$
  `$\frac{a}{b} \geq \frac{c}{d}$`
- $\frac{\sqrt{x+2}}{x^2-3}$
  `$\frac{ \sqrt{x + 2} }{x^2 - 3}$`

Variable Size of Braces

- Sizes + braces: () or {} or []
  - \Bigg \bigg \Big \big
- $\Big[\Big\{\big(3+2\big)/5\Big\}\times 6\Big]$

```
$ \bigg[ \Big\{ \big(3+2\big) / 5 \Big\} \times 6 \bigg] $
```

- $\bigg\{\Big(\frac{8}{4}\Big)+\Big(\frac{3}{4}\Big)\bigg\}$

```
$\bigg\{ \Big(\frac{8}{4}\Big) + \Big(\frac{3}{4}\Big) \bigg\}$
```

Summation

- Syntax

  ```
  \sum_{min}^{max}
  ```

- $\sum_{i=a}^{b} g(i) = 0, \text{for } b < a.$

  ```
  \[ \sum_{i=a}^{b}g(i)=0, \text{for} \ b < a. \]
  ```

- $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$

  ```
  \[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}  \]
  ```

Now, you can ...

- Typeset simple mathematical expressions
- Search symbols and commands
- Typeset fractions and summation
- Adjust the size of the braces

Thank you