Chapter 4: Writing Mathematics

1 Mathematical expressions

LaTeX allows the users to write Mathematics with two modes (methods):

- **Inline:** means to write Mathematics with text around it. It suffices to put the mathematical expression between two dollar symbols `$...$`.
- **Display:** means to write Mathematics in separated lines (no text around). The mathematical expression should be put between `\[...\]`, `$$...$$` or inside the environment `\begin{equation}...\end{equation}`.

Source code

```
Let $a,b,c$ be real numbers with
$a\neq 0$, then the quantity \
[\Delta=b^2-4ac\] is called
the\emph{ discriminant} of the
\emph{quadratic second-order
equation}\begin{equation}ax^2+bx+c=0
\end{equation}
```

Output

Let a, b, c be real numbers with $a \neq 0$, then the quantity

$$\Delta = b^2 - 4ac$$

is called the *discriminant* of the *quadratic second-order equation*

$$ax^2 + bx + c = 0 \tag{1}$$

Figure 1: Inline and Display math modes

2 Symbols

Writing mathematics requires the use of many symbols, here are some of them:

Source code

```
\begin{tabular}{l}
    $\alpha, \beta,\gamma,\delta,\epsilon,\Gamma,\Delta$ \\
    \hline
    $\cup,\cap,\times$ \\
    \hline
    $<,>,\leq,\geq,\in,\subset$\\
    \hline
    $\sum,\prod,\int_{a}^{b}$\\
    \hline
    $\mathbb{N},\mathbb{Z},\mathbb{Q},\mathbb{R},\mathbb{C}$
\end{tabular}
```

Output

$\alpha, \beta, \gamma, \delta, \epsilon, \Gamma, \Delta$
$\cup, \cap, \times$
$<, >, \leq, \geq, \in, \subset$
$\sum, \prod, \int_a^b$
$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}, \mathbb{C}$

Figure 2: Mathematical Symbols

The last line of symbols requires the package `amssymb`.
For a more complete list, visit this page on Overleaf.

3 Tables

Tables were already studied, but there is some kind of tables, very useful, specifically designed for math mode writing, which means that there is no need for $ symbols to insert mathematical expressions. This environment is `\begin{array}{}...\end{array}`. This environment must be inserted within a math mode environment.

Source code

```
\[
\begin{array}{lcr}
  1.25 & 2 & -3\textbf{ This is a bold text entry} \\
  0.5  & 4 &  12 This is not a text \\
\end{array}
\]
```

Output

$$\begin{array}{lcr} 1.25 & 2 & -3 \textbf{ This is a bold text entry} \\ 0.5 & 4 & 12 \mathit{This is not a text} \\ \end{array}$$

Figure 3: Array: a table in math mode