

## 1 Mathematics

### 1.1 Sets

The set of all elements  $x$  that satisfy a certain condition is denoted for example by

$$\{x : \|x\| \leq 1\} \text{ or } \{x \in A \mid x \geq 0\},$$

which you get by writing  $\{\backslash, x : \backslash|x\| \leq 1\}$  and  $\{\backslash, x \in A \mid x \geq 0\}$  respectively. The vertical bar in the middle should be given as `\mid`, because this provides the correct spacing. With the colon, the spacing is automatically correct for this case. Larger vertical bars, (in conjunction with larger braces) can be obtained by `\bigm|`, `\Bigm|`, `\biggm|`, and `\Bigbm|`, respectively. Knuth [K, p. 134] recommends to add the extra `\`, spacing inside set braces in the above case, but not when the elements of the set are enumerated:  $\{1, 2, \dots, n\}$

### 1.2 Functions

To indicate that  $f$  is a function from a set  $A$  to a set  $B$ , one writes  $f: A \rightarrow B$ . To get this in T<sub>E</sub>X, one has to type `$f\colon A\to B$`. (`\to` is equivalent to `\rightarrow`.) If you don't want the colon to be too far from the  $f$ , you should not enter the colon as a colon (`:`) instead of the command `\colon`. This kind of colon is appropriate for proportions

$$a : b : c = d : e : f$$

or for set notation (see above).

## 2 Text

### 2.1 Hyphens and dashes

T<sub>E</sub>X has at least five characters that consist of a horizontal line: the hyphen (`-`), the en-dash (`—`), the em-dash (`---`), the minus (`-`), and the underscore (`_`), which are obtained, respectively, by typing `-`, `--`, `---`, `$-$`, and `\_`. The underscore is easily distinguished, and the em-dash is not very common. Most confusion occurs between the hyphen and the en-dash.

#### 2.1.1 Don't overuse en-dashes!

The *hyphen* is the character that is automatically inserted when T<sub>E</sub>X breaks (*hyphenates*) a long word at the end of a line. It is also used to join different parts of compound words.

Don't use the en-dash as an element of the spelling of individual words!

Since I know that some people disagree with me on this point, I have to cite *Webster's* dictionary or the authority of Knuth himself [K, p. 4]. The hyphen is used for example in son-in-law, home-grown,  $x$ -axis,  $n$ -tuple, half-plane, quasi-periodic, twenty-one.

### 2.1.2 When to use en-dashes

1. The en-dash is used for ranges, or between numbers: Monday–Friday, pp. 212–219, statements (i)–(iv), exercise 1.2–3, equation 3–1.
2. The en-dash may be used to join the names of several persons in the name of a theorem, a conjecture, an algorithm, etc.: the Schröder–Bernstein theorem, Bose–Einstein statistics. Here is one reason to avoid the hyphen in this case.

The abbreviation AVL in *AVL-trees* stands for Adelson-Velskiĭ–Landis trees, which are named after Adelson-Velskiĭ and Landis. Adelson-Velskiĭ is *one* person carrying a *double name*. Similarly, the Birch–Swinnerton-Dyer Conjecture in number theory is named after two people. So we should definitely use a hyphen in double names that are written with a hyphen. (By way contrast, consider *van Emde Boas trees* with no hyphens.) And for distinction, we might want to use the en-dash to separate the two names. To remain consistent, we might always use an en-dash to join the names of several people in the name of a theory or a theorem or other concept. However, I wouldn't insist on this. To my feeling, Gram-Schmidt orthogonalization, Reed-Solomon codes, or the Euler-Poincaré formula with a hyphen is equally acceptable, and it is common to see it printed in this way.

### 2.1.3 The minus sign

Don't forget to enclose the minus sign by \$'s if you intend to denote a negative number; write \$-5\$, which gives  $-5$ , not  $-5$ .

## 2.2 Getting a ~ printed

The tilde character ~ may be rarely needed in mathematical text, but it is increasingly common to give URL's ("uniform resource locators") on the World-Wide Web as part of literature references. Or an author might want to specify his or her home-page in addition to the usual coordinates. References to documents in a person's home directory typically look like

`http://www.math.tu-graz.ac.at/~jack/pubs/paper1.ps.gz`

where `jack` is the person's login name in the computer. Typing `~` in `TEX` produces a space, and the command `\~` is used for an accent. So in order to get a `~` on the printed output, you may type `\char'\~`. If you need a white space after the tilde, enclose the command in braces: `{\char'\~}`. (People who want to remember ASCII codes can also write `\char126` to get `~`.) After giving the definition `\chardef \wigggle '\~`, the command `\wigggle` can be used to produce a `~`.

A similar situation occurs for `@` in electronic mail addresses, like

```
rote@inf.fu-berlin.at
```

In standard `TEX` and `LATEX`, typing a `@` will work, but in `AMS-TEX`, `@` is used as a special character to perform all kinds of tasks. In order to get a `@` in `AMS-TEX`, you have to type `@@`. Typing `{\char'\@}` is a solution that works in all cases.

### 3 Reference

#### References

[K] D. E. Knuth, The `TEX`book. Addison-Wesley, Reading, Mass., 1986.