# Special characters in LaTeX

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**Abstract**

*Typesetting special/reserved characters, especially in maths-rich text, is always troublesome in LaTeX .
Here is how you can handle this challenge.*

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# 1 Reserved characters in LaTeX

LaTeX is primarily used for typesetting standard Latin texts (usually encoded in ASCII). There are several other characters which are used in such conventional texts – we will call them (interchangeably) as reserved characters or special characters.[1]

LaTeX has 10 reserved characters:  \ { } $ & # ^ _ % ~  Usually LaTeX handles these characters according to its contextual meaning.  But, many times, one would often like to display/render the character as it is (rather than its implied meaning).

There are many ways to do this:

- Use  \verb  command

- Precede the character by an escape \ character

- Use the character's LaTeX name e.g. \textasciitilde\
   \textasciicircum\  \textbackslash\  to get
  boo ~ foo, foo ^ boo, foo \ foo

# 2 Special characters

Certain characters do not form part of the standard Latin (English) alphabet and cannot be encoded using ASCII encoding. These characters (aka symbols) are used often by mathematicians in specific contexts. Even, LaTeX commands themselves use conventional English, so including them in a standard text (without LaTeX grabbing it up first) is a major challenge. This current article gives many examples where LaTeX commands are included verbatim in the main text.

## 2.1 Unusual symbols

### Delimiters

There is a big list of delimiters used in maths mode in LaTeX . For instance,

```
( a ), [ b ], \{ c \}, | d |, \| e \|
\langle f \rangle, \lfloor g \rfloor,
\lceil h \rceil, \ulcorner i \urcorner,
\llcorner v \lrcorner
```

give :
$(a), [b], \{c\}, |d|, \|e\|, \langle f \rangle, \lfloor g \rfloor, \lceil h \rceil, \ulcorner i \urcorner, \llcorner v \lrcorner$

Notice that a \| gives a `twin` ||. :: $\|partha\|$

A single | gives : ——. A twin || gives : ———.

Use a `\vert` in math mode, for a single vertical bar |.

Or use the pair `\lvert \rvert` in mathmode, for $|x|$

To void the delimiter on one side, and give limits, like this : $\frac{x^3}{3}\Big|_0^1$ (The `\left.` suppresses the left delimiter ) using `\left.\frac{x^3}{3}\right|_0^1` .

Mathematical symbols are explained in greater detail, in a separate section, below.

### Non-linguistic symbols

Sometimes, we may have to typeset symbols with no linguistic value. Examples are: musical notes, chessmen, playing cards, mathematical symbols.

Here is an example of some musical symbols (using the package wasysym) :

♪   𝅗𝅥   ♫   𝅝   ♩   ♮   ♭   ♯

### Modified Latin/English characters

If you use \i or \j you get ı or ȷ without the dot. You can add your own characters on top of these, in place of the dots. For instance, \~\i gives ĩ (without the dot) and \~i gives ĩ (with the dot). \^\j gives ĵ (the dot is missing) and \^j gives ĵ (with the dot)

If you use \ae or \AE you get æ or Æ

\aa\ and \AA give å and Å

Try > to get ¿ or try < to get ¡ .

### Separators - hyphen, en-dash, em-dash

These separator symbols appear often in many maths intensive texts, and also in conventional texts. Although they look similar, there are subtle visual differences between them.

A plain - gives - (a hyphen). A minus sign − comes from $-$ .

The dash is a punctuation mark that is similar in appearance to the hyphen and minus sign but differs from these symbols in length and, in some fonts, height above the baseline. The most common versions of the dash are the en dash –, longer than the hyphen; the em dash —, longer than the en dash. A simple hyphen - is made with −. An en-dash – is made with --, an em-dash — is made from ---.

### An unusual marker

The § symbol is used as a counter in certain documents. It is made with \S. Here are some examples §        §         **§** .

**One more unusual marker**

A \P produces a pilcrow ¶ mark.

¶ marks are used for identifying new paras.

**Accents, diacriticals**

Many non-English languages use the same Latin characters (like English) , but add diacritical marks (accents) on them. Here are a few examples:

A Noël, allez à ce bistrôt français à Berlin Straße avec vos amis pour déguster du très bon café. Ça va ?

Paul Erdős met Kurt Gödel and saw a Möbius strip made by Pólya

¡ Senõrita !

**Two special trouble makers**

The backslash and the tilde characters are major causes of headaches for the LaTeX typesetter. \textbackslash produces a simple \ in text-mode. One particularly tricky case is \\. The \\ is usually used for indicating a line break. Every time LaTeX sees a \\ it introduces a line break. Use a single \textbackslash to get \. Use \textbackslash \textbackslash to get\\in the middle of any text.

The math-mode \sim gives ∼ and \texttildelow gives ˷(from textcomp package) are options for a lower tilde while \textasciitilde produces a raised tilde (in text-mode) as in boo˜foo . The \~ gives a tilde over a character, as in España .

**Miscellany magic**

*Partha*
*Made with the new command itbf*

*Using it all together*:

- § First item

- • Second item

¶ Third one

$ One more

˜ Last one

**Money matters**

Here is an example of special characters for some currency symbols [12] :

$$ \$\ 5432 + \pounds\ 5432 + \text{€}\ 5432 + ₹\ 5432 + ¥5432 $$

That's a lot of money !

## 2.2  Math symbols

LaTeX offers a bewildering range of special symbols for mathematics [9].Each symbol has a name. Use that name to create the symbol you want e.g. use `\subseteq` to get a $\subseteq$ sign. Note that the name must be used in math mode only (enclose within a pair of $).

Take a look at [10], [6] and [7] for a whole lot of math symbols and usage examples.

**Therefore, because**

`\therefore` and `\because`  must be used in math mode.

$x = y$ and $y = z$
$\therefore x = z$

$x = z$
$\because x = y$ and $y = z$

**Angles**

In a right angled triangle there is one angle which is exactly 90° (made with `\textdegree`)

In an equilateral triangle, all angles are equal to 60°  (made with `\degree`)

If ABC is an equilateral triangle

$$\angle ABC = \angle BCA = \angle CAB = 60° \text{ and}$$

$$AB = BC = CA$$

The *textdegree* command works only if you have "usepackage[latin1]{inputenc}" in the Preamble of your document. The \degree command was defined in the Preamble of this document.

LATEX offers two other styles of denoting an angle:

**Spherical angle :** \sphericalangle ABC gives: $\sphericalangle ABC$

**Measured angle :** \measuredangle ABC gives: $\measuredangle ABC$

# 3   Closing remarks

This is a LATEX document, created under Linux, using Kile. You can get the LATEX source of this document from the author at : drpartha@gmail.com . Please mention the Reference Code, and Version code, given at the top of this document. Please follow the "basic rules of decency" explained in [5]

Readers are requested to send all remarks, criticisms and suggestions to the author at drpartha@gmail.com.

A whole lot of similar articles and tutorial material is available for download from [11] This article is released under a liberal license [13] and published on the web at [14].

# 4   About the author



Figure 1: The pensive Professor

Parthasarathy is an aggressive supporter of FOSS. He teaches discrete mathematics, and preaches LATEX and Linux, to students of Computer Science, at Hyderabad, India, and at Kathmandu, Nepal. He would be happy to assist anyone, particularly students, teachers, and institutions, who are genuinely interested in these topics. His contact address is : drpartha@gmail.com

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