

# The numprint package

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## Abstract

This package prints numbers with a separator every three digits and convert numbers given as `12345.6e789` to `12 345,6 · 10789`. Numbers are printed in the current mode (text or math) in order to use the correct font.

Many things, including the decimal sign, the thousand separator, as well as the product sign can be changed by the user, e.g., to reach `12,345.6e789`. If requested, numprint can round numbers to a given number of digits.

If an optional argument is given it is printed upright as unit. Numbers can be rounded to a given number of digits.

The package supports an automatic, language-dependent change of the number format.

Tabular alignment using the `tabular*`, `array`, `tabularx`, and `longtable` environments (similar to the `dcolumn` and `rccol` packages) is supported using all features of numprint. Additional text can be added before and after the formatted number.

If you want to print numbers with different bases (octal, hexadecimal, etc.) use the `nbaseprt` package which comes with the `numprint` package.

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## Remarks

! *The `\fourdigitsep`, `\fourdigitnosep`, `\adddmissingzero`, `\noadddmissingzero`, `\digits`, `\nodigits`, `\exponentsdigits`, and `\noexponentdigits` commands have been renamed to `\npfourdigitsep`, `\npfourdigitnosep`, `\npadddmissingzero`, `\npnoadddmissingzero`, `\npdigits`, `\npnodigits`, `\npexponentsdigits`, resp. `\npnoexponentdigits`.*

! *From version 1.00 to 1.10, the column types have been changed; see section 6. If you want to preserve the old column types, use the package option `oldcolumnntypes`.*

For typesetting this documentation, the usage of different font shapes has been reduced as much as possible in order to save disk memory and download times. Thus, for nearly all characters, the design size 10 pt has been used. This reduced the size of the PDF file for version 1.10 from 858 KB to 396 KB. Please excuse that shortcoming in the typography.

## 1 Load the package

To use this package place

```
\usepackage{numprint}
```

in the preamble of your document. No options are necessary but some are available. They are mentioned where their usage is described and in section B.1.

## 2 Print numbers in text and math mode

`\numprint` This package provides the command `\numprint[<unit>]{<number>}` that prints the *<number>* given in the required argument. The number is printed in the current mode (math or text mode) so that an eventual chosen difference between mathematical and text numbers stays visible (e.g., by using the `eco` package).

Numbers may contain of these characters: “+-\pm0123456789. ,eEdD”. Spaces, “\,” as well as “~” in the argument are ignored. Either a “,” or a “.” can be used as decimal sign. By default, no thousand separators are allowed in the argument.<sup>1</sup> “E”, “e”, “D”, or “d”<sup>2</sup> is converted to an exponential format (e.g.,  $x \cdot 10^y$  or  $x \times 10^y$ , depending on the format settings described later). “\pm” and “+-” produce a  $\pm$ .

For example, typing

```
\numprint{-123456}; \numprint{\pm 123456}; \numprint{+-3,1415927e-3.1}
```

<sup>1</sup>Section 8.2 describes how this can be changed.

<sup>2</sup>This is useful for FORTRAN produced numbers.

leads to “ $-123,456; \pm 123,456; \pm 3.141,592,7 \times 10^{-3.1}$ ”. Notice that “.” and “,” can be mixed within one number and are converted to the chosen decimal sign for the output.

The number is printed in the active mode (text mode resp. math mode). This may be important if the digits are different in text and math mode as in this document that uses old-style figures in text and lining figures in math mode.<sup>3</sup> See the difference between “ $123,456.134 \times 10^{123}$ ” and “ $123,456.134 \times 10^{123}$ ”, produced by

```
‘\numprint{123456.134e123}’ and ‘\numprint{123456.134e123}$’
```

If no number is given before the exponential characters “e”, “E”, “d”, resp. “D”, a pure exponential format is generated. For example, typing

```
\numprint{e4.3242}
```

leads to “ $10^{4.324,2}$ ”. This also works with given signs, e.g.,

```
\numprint{-e4.3242}, \numprint{+-e4.3242}
```

leads to “ $-10^{4.324,2}, \pm 10^{4.324,2}$ ”.

Since `\numprint` expands the argument before typesetting it you may also use commands inside the argument, e.g.,

```
\def\numberbefore{1234}%
\def\totalnumber{\numberbefore.5678}%
\numprint{\totalnumber}
```

leads to “1,234.567,8”.

If the optional argument is given it is printed as a *unit* in math mode with an upright font (`\mathrm`), e.g.,

```
\numprint[N/mm^2]{-123456}
```

leads to “ $-123,456 \text{ N/mm}^2$ ”.

By default, the space between the number and the unit is `\,`. One exception is the degree symbol which is typeset without a distance to the number, e.g.,  $360^\circ$  in contrast to  $273.15^\circ\text{C}$  (only a single degree symbol is typeset without a separator). The `numprint` package detects this automatically if the `\tcdegree` command of the `mathcomp` package, the `\textdegree` command of the `textcomp` package, or the `\degree` command of the `gensymb` package is used, e.g.,

```
\numprint[\tcdegree]{360}, \numprint[\degree]{360}
```

Unfortunately, typing in the “o” sign directly cannot be detected (any help welcome).

You can change the spacing between the number and units, percent signs, or degree symbols. Have a look to Section 8.1.

If you want to use one of the `textcomp` symbols  $^\circ\text{C}$  (`\textcelsius`),  $\Omega$  (`\textohm`),  $\mu$  (`\textmu`), or  $\text{‰}$  (`\textperthousand`) you have to load either the `mathcomp` or the `gensymb` package because the unit is printed in math mode. If you decide to use the `textomp` package use `\tc<name>` instead of `\text<name>`, e.g., `\tcelsius` instead of `\textcelsius`. If using `gensymb` just use `\<name>`, e.g., `\celsius`.<sup>4</sup>

`\np` Since it is timeconsuming to type in the long command `\numprint` for every number in a text the shortcut `\np` can be defined by specifying the package option `np`.

By default, numbers are written in the format `12 345,123 45 · 1012 345`, for instance. This means, decimal sign “,”, thousand separator “\,”, and product sign “`\cdot`”. This accords to German number formats and is a result of the history of this package. How you can change this is described in the following sections. Especially, have a look at the `autolanguage` package option in section 5.

## 2.1 Print counters and lengths

If you want to print a counter or a length, you may of course use

```
\numprint{\arabic{page}}
```

resp.

```
\makeatletter
\numprint[pt]{\strip@pt\textwidth}
\makeatother
```

But these methods are not really nice.

`\cntprint` For printing counters, you may use `\cntprint[<unit>]{<counter>}` where *<unit>* is an optional unit that is printed as by `\numprint`. *<counter>* is the name of a L<sup>A</sup>T<sub>E</sub>X counter, for example,

```
$_\cntprint{page}$
```

leads to “5”.

`\lenprint` Lengths can be printed using `\lenprint[<unit>]{<length>}`. *<length>* is the macro containing a L<sup>A</sup>T<sub>E</sub>X length or a T<sub>E</sub>X dimension, e.g., `\textwidth`. *<unit>* is a different thing here. If the unit is not given `\lenprint` uses L<sup>A</sup>T<sub>E</sub>X’s standard and prints the length in pt:

```
$_\lenprint{\textwidth}$
```

leads to “355 pt”. Giving `pt` does not change anything. But if you use other units, e.g., `mm`, `cm`, or `in`, the length is written using the given unit:

```
$_\lenprint[pt]{\textwidth}$,
$_\lenprint[in]{\textwidth}$,
$_\lenprint[bp]{\textwidth}$,
$_\lenprint[mm]{\textwidth}$,
$_\lenprint[cm]{3\textwidth}$
```

gives “355 pt, 4.913,1 in, 353.672,87 bp, 124.766,77 mm, 37.425,16 cm”.

As you can see in the example, it is also possible to specify a factor in the argument, e.g. `3\textwidth`. When printing lengths, it is often desirable not to print all decimal places. `numprint` can round numbers, described in section 3.4.

`\lenprint` knows the units `pt`, `bp`, `in`, `ft`, `mm`, `cm`, `m`, and `km`. Section 4 describes how to add or change units.

---

<sup>3</sup>This is only the case if the `eco` package is available on your system.

<sup>4</sup>If you still use `\text{<name>}` `numprint` uses `\tc{<name>}` or `\{<name>}` and generates a warning if one of these commands is available, and produces an error if not.

## 3 Customization

### 3.1 Eliminate separators for four-digit numbers

At least in German it is common not to add a separator to four-digit numbers in non-technical texts, e.g., to typeset “1234” instead of “1,234”, but longer numbers are separated: “12,345”. If a number, in contrast, has less than five digits on one side of the decimal sign but five or more digits on the other side, separators are inserted on both sides, e.g., “1234.1234” but “1,234.123,45”.

`\npfourdigitsep`  
`\npfourdigitnosep` This behaviour can be achieved using the command `\npfourdigitnosep`. If using this switch inside a group the change is local. You can switch back to separating with `\npfourdigitsep`. An example:

```
\npfourdigitnosep$numprint{1234.1234}$, $numprint{12345.12345}$ --  
\npfourdigitsep$numprint{1234.1234}$, $numprint{12345.12345}$
```

Leads to “1234.1234, 12,345.123,45 – 1,234.123,4, 12,345.123,45”. Default values can be set by the package options `sepfour` and `nosepfour`.

### 3.2 Add missing zeros before or after decimal sign

`\npaddmissingzero`  
`\npnoaddmissingzero` Sometimes people let out a leading zero or a zero after the decimal sign, e.g., “123.” or “.123”. Numprint can add the left out zero, when `\addmissingzero` is used. If, however, no decimal sign is given, e.g., “123”, no decimal sign or zero is appended. Adding zeros can be switched off with `\noaddmissingzero`. The corresponding package options are `addmissingzero` and `noaddmissingzero`. The default is `addmissingzero`.

### 3.3 Add a plus sign

`\npaddplus`  
`\npnoaddplus` Using the `\npaddplus` command or the package option `addplus`, a plus sign can be added to a number that is specified without a sign. This can be switched off using `\npnoaddplus` resp. `noaddplus`.  
`\npaddplusexponent`  
`\npnoaddplusexponent` The commands `\npaddplusexponent` and `\npnoaddplusexponent` resp. the package options `addplusexponent` and `noaddplusexponent` do the same for the exponents that the commands/options described above do for the number.

### 3.4 Rounding numbers

`\nprounddigits`  
`\nproundexpdigits`  
`\npnoround`  
`\npnoroundexp` By default, as many digits are printed after the decimal sign, as the `\numprint` command gets as argument. This behaviour can be changed to print a given number of digits where the number is rounded resp. filled with zeros.

This can be switched on using the `\nprounddigits{<digits>}` command for ordinary numbers and the `\nproundexpdigits{<digits>}` command for exponents. Rounding is switched off with `\npnoround` resp. `\npnoroundexp`. For example,

```
\nprounddigits{2}$numprint{1.123}$, $numprint{1.149}$,  
$numprint{1}$, $numprint{9.999}$ $numprint{-9.999}$ --  
\npnoround$numprint{1.123}$, $numprint{1.149}$,  
$numprint{1}$, $numprint{9.999}$, $numprint{-9.999}$
```

leads to “1.12, 1.15, 1.00, 10.00 – 10.00 – 1.123, 1.149, 1, 9.999, –9.999”

### 3.5 Padding a number on the left side

`\nplpadding` Sometimes it is desirable to have a number of a fixed length with the missing digits filled with a character (mostly the character “0”, so this is the default). This can be achieved calling `\nplpadding[⟨character⟩]{⟨digits⟩}`. This affects only the mantissa, the part after the decimal sign and signs are not counted! If the original number has more digits than `⟨digits⟩` no characters will be inserted. For example,

`\npnolpadding`

```
\nplpadding{6}%
$numprint{1234}$, $numprint{-1234}$,
$numprint{12345678}$, $numprint{1234.5678}$ --
\nplpadding[x]{6}%
$numprint{1234}$, $numprint{-1234}$,
$numprint{12345678}$, $numprint{1234.5678}$
```

leads to “001,234, -001,234, 12,345,678, 001,234.567,8 - *xx*1,234, -*xx*1,234, 12,345,678, *xx*1,234.567,8”

`\npnolpadding` switches padding off.

### 3.6 Replace zeros by other characters

`\npreplacenu11` For amounts of money, sometimes a zero after the decimal sign is replaced by different symbols, as for example “—”. This can be done by calling the command `\npreplacenu11{⟨replacement⟩}`, e.g.,

```
\npreplacenu11{\mbox{---}}
```

Here, `\mbox` guarantees that “—” is printed in text mode.<sup>5</sup>

It can be switched off using `\npprintnull`.

### 3.7 Change the format of units

`\npunitcommand` By default, the unit is printed in math mode with an upright font. This is reached by using the `\npunitcommand` macro which by default is defined as follows:

```
\newcommand*\npunitcommand[1]{\ensuremath{\mathrm{#1}}}
```

If you want to change this, redefine the `\npunitcommand`. You really should use either `\ensuremath` or `\text`<sup>6</sup> to ensure math or text mode respectively. `\npunitcommand` has to take one mandatory argument.

For example, a blue unit is reached by

```
\renewcommand*\npunitcommand[1]{\ensuremath{\color{blue}\mathrm{#1}}}
```

And here is the result: 300 N/mm<sup>2</sup>

## 4 Add more units to `\lenprint`

`\npdefunit` The command `\npdefunit{⟨unitname⟩}{⟨unit⟩}{⟨scale⟩}` can be used to define new units or to redefine existing ones. For example, mm is defined as follows:

```
\npdefunit{mm}{mm}{0.35145980351}
```

<sup>5</sup>You should better use `amsmath` and the command `\text` which preserves the correct text size, too.

<sup>6</sup>Provided by `amsmath`.

Table 1: Default values for language settings

| language   | thousand<br>sep. | decimal<br>sign | product<br>sign | unit<br>sep. | percent<br>sep. | degree<br>sep. |
|------------|------------------|-----------------|-----------------|--------------|-----------------|----------------|
| English    | ,                | .               | \times          | \,           | \,              | none           |
| German     | \,               | ,               | \cdot           | \,           | \,              | none           |
| Portuguese | .                | ,               | \cdot           | \,           | \,              | none           |
| Dutch      | \,               | ,               | \cdot           | \,           | none            | none           |
| French     | ~                | ,               | \cdot           | \,           | \,              | none           |

The first argument  $\langle unitname \rangle$  is the L<sup>A</sup>T<sub>E</sub>X internal name that will be given as unit in the `\lenprint` command. The second argument  $\langle unit \rangle$  is the text that will be printed out.

The  $\langle scale \rangle$  arises from the fact that the default unit pt is defined as  $1\text{pt} = 1/72.27\text{in} = 0.013,837,000,13\text{in}$  and  $1\text{in} = 25.4\text{mm}$ . Thus,  $1\text{pt} = 0.013,837,000,13 \times 25.4\text{mm} = 0.351,459,803,51\text{mm}$ . For defining a new unit, the factor from pt to the desired unit has to be calculated and given as third argument of `\npdefunit`. To redefine a unit with unchanged scale, use `*` instead. For example,

```
\npdefunit{in}{\!''}{*}
```

redefines `in` to print `"` as unit instead of the default `in`. The `\!` is used to remove the separator between number and unit (`\,`) again. This only works correctly if `\,` and `\!` use the same measure.

```

$\lenprint[in]{\textwidth}$,
\npdefunit{in}{\!''}{*}%
$\lenprint[in]{\textwidth}$

```

leads to `"4.913,1in, 4.913,1"`.

## 5 International support

As mentioned above, `numprint` uses German settings for numbers: thousand separator `\,`, decimal sign `,`, product sign `\cdot`, unit separator `\,`, and no degree separator, by default. This will stay stable for compatibility with older versions even if its unlogical since the default language of L<sup>A</sup>T<sub>E</sub>X is English.

Using the package option `autolanguage` this can be fixed. If you are using this option without the `babel` package the settings are switched to English at `\begin{document}`. See Table 1.

```
\selectlanguage
```

If you are using the `babel` package in conjunction with the `autolanguage` package option, the behaviour of `numprint` alters with the active language. If you, for instance, use

```
\selectlanguage{ngerman}
```

the German settings are selected. If you then switch back to English, the English settings are active again.

The current version supports English, German, Portuguese, Dutch, and French. Unfortunately, I don't really know how to write numbers in other languages than

German. I am quite sure that the English version also is correct.<sup>7</sup> But please help me to add other languages.

If you want other settings than the default ones, listed in Table 1, please refer to Section 8.1.2.

As long as `numprint` does not support your language you may add the definitions by yourself. How this can be done is also described in Section 8.1.2.

## 6 Print aligned numbers in tabulars

Aligning numbers in tabulars is provided by the `dcolumn` and `rccol` packages. But they have two disadvantages. First, they do not support typesetting numbers in the same way as `\numprint` does. Second, they force the numbers to be typeset in math mode. Thus, this packages provides own mechanisms to gain aligned numbers.

In former versions up to 1.00, the align mechanism in tabulars has been somehow weak because the author had to repeat the `\numprint` call in every table cell. This has been improved in version 1.10. For compatibility reasons, the old column types `n` and `N` have been preserved if you specify the `oldcolumntypes` package option; they will be discussed in section `sec:column:old`.

### 6.1 The new column types

`column type n` The `numprint` package provides the column type `n` that takes two mandatory arguments. They define the number of digits before and the number of digits after the decimal sign. The results can be seen in the left column of the tabular below. You can use this column type as the normal column types, e.g.,

```
\begin{tabular}{n{3}{4}n{4}{2}}
```

The numbers are printed in a reserved space with the necessary width for the specified numbers, aligned at the decimal sign. If a column contains numbers that have an exponent it is appended left-aligned while the width of the column is extended by the required space. This is shown in the first column in the example below.

If you, in addition, want to reserve space for digits in the exponent you can insert one (specify numbers of digits before the decimal sign) or two (number of digits before and after the decimal sign) optional arguments, as can be seen in columns 2 and 3 in the example below. If you reserve space for the exponent, too long exponents may exceed the tabular cell (as can be seen in the second column).

This example tabular<sup>8</sup>

|                                |                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| $123.45 \times 10^{12}$        | $123.45 \times 10^{12}$        | $123.45 \times 10^{12}$        | $123.45 \times 10^{12}$        |
| $12,345.678 \times 10^{123}$   | $12,345.678 \times 10^{123}$   | $12,345.678 \times 10^{123}$   | $12,345.678 \times 10^{123}$   |
| $123.45 \times 10^{12.3}$      | $123.45 \times 10^{12.3}$      | $123.45 \times 10^{12.3}$      | $123.45 \times 10^{12.3}$      |
| $12,345.678 \times 10^{123.3}$ | $12,345.678 \times 10^{123.3}$ | $12,345.678 \times 10^{123.3}$ | $12,345.678 \times 10^{123.3}$ |

is produced by the following code:

<sup>7</sup>Maybe, the percent sign separator `\`, is not common, but I will leave its value unchanged to preserve compatibility with older versions.

<sup>8</sup>The tabulars are ugly here. But the only important thing is to show the effects of the alignments.

```

\tabcolsep0mm\small
\begin{tabular}{|n{5}{3}|n{3}{5}{3}|n{3}[1]{5}{3}|N{5}{3}|}
\hline
123.45e12& 123.45e12& 123.45e12 & 123.45e12 \\
12345.678e123& 12345.678e123& 12345.678e123& 12345.678e123 \\
123.45e12.3& 123.45e12.3& 123.45e12.3& 123.45e12.3 \\
12345.678e123.3& 12345.678e123.3& 12345.678e123.3& 12345.678e123.3 \\
\hline
\end{tabular}

```

The `n` column type prints the number in math mode. Thus, the first three columns in the example are printed with lining figures. To print numbers in text mode, you can use the `N` column type as shown in column four of the `tabular`.<sup>9</sup> It takes the same arguments as the `n` column type.

You may put additional text into tabular cells. The `numprint` package uses an algorithm to determine which part is the number and which is additional text. In order to preserve spaces and to use characters as text that could also be part of a number (e.g., digits or the characters “e”, “E”, “d”, or “D”) you have to enclose the text in braces, for example “`{hello} 1234`” instead of “`hello 1234`”. (In some rare cases, even two pairs of braces is necessary. This is the case if you want to use a single character that may also be used in a number, e.g., “`{3} 1234`”.<sup>10</sup>) If you don’t use these enclosing braces strange results may appear. For preceding text, you have to ensure that it has the same width for all lines of the same column. Have a look at the following example:

```

\begin{tabular}{n{2}{1}n{2}{1}n{2}{1}n[1]{2}{1}}
\toprule
{without braces}&
{with braces}&
{with braces and box}&
\multicolumn{1}{l}{with braces, exp, and box}
\\
\midrule
abc def 12,3e3 rt&
{abc def } 12,3e3 { rt}&
{\npmakebox[abc def ][1]{abc def }} 12,3e3 { rt}&
{\npmakebox[abc def ][1]{abc def }} 12,3e3 { rt}
\\
more 45,1 txt&
{more } 45,1 { txt}&
{\npmakebox[abc def ][1]{more }} 45,1 { txt}&
{\npmakebox[abc def ][1]{more }} 45,1 { txt}
\\
\midrule
not blue 45,1 txt&
{\color{blue}blue } 45,1 { txt}&
{\color{blue}\npmakebox[abc def ][1]{blue }} 45,1 { txt}&
{\color{blue}\npmakebox[abc def ][1]{blue }} 45,1 { txt}
\\

```

<sup>9</sup>If you use a `tabular` environment that prints its arguments in math mode, e.g., the `array` environment, also `N` prints the numbers in math mode.

<sup>10</sup>It is the same if the text starts with one of some special commands that normally don’t occur at the beginning of `tabular` cells, `\end`, `\tabularnewline`, `\nprt@end`, `\endtabular`, `\csname`, and `\relax`.

```

\bottomrule
\end{tabular}

```

The result looks as follows:

| without braces                              | with braces  | with braces and box                                | with braces, exp, and box                          |
|---|--|--|--|
| abcdef12,3e3rt<br>mor10 <sup>45.1</sup> txt | abc def 12.3 × 10 <sup>3</sup> rt<br>more 45.1 txt | abc def 12.3 × 10 <sup>3</sup> rt<br>more 45.1 txt | abc def 12.3 × 10 <sup>3</sup> rt<br>more 45.1 txt |
| notblu10 <sup>45.1</sup> txt                | blue 45.1 txt                                      | blue 45.1 txt                                      | blue 45.1 txt                                      |

In the first column, the texts before and after the number are not enclosed by braces. Then, strange results appear: In the first line, “de” is interpreted as number. Thus, it is printed in math mode, and the rest of the cell, “f 12,3e3 rt” is printed as text, again. In the second line, the part “e 45,1” is printed as number.

This strange behaviour can be avoided by enclosing the texts by braces, as mentioned above and shown in the second column. Thus, the texts are printed correctly. A space in the enclosed texts can separate the text from the number, as done in the example. Since the left texts have different widths the alignment of the numbers is broken, here.

This can be fixed by putting the contents in boxes, using the `\makebox` or `\npmakebox` command, as shown in the third column. The `\npmakebox` has a similar syntax as the `\makebox` command but uses a text instead of a length to determine the width of the box: `\npmakebox[⟨text 1⟩][⟨justification⟩]{⟨text 2⟩}`. The command determines which width `⟨text 1⟩` would have and typesets `⟨text 2⟩` into a box of this width.

If you put the preceding text in each line in such a box the number will be aligned as desired.

Still, the text on the right-hand side of the numbers is not aligned. This can be fixed by specifying the number of digits of the exponent, as shown in the fourth column.

The third line is a little bit different from the others. Here, not only text is inserted but also a command that changes the output of the numbers. Even such commands have to be enclosed by braces.

For producing tabular cells that don’t contain a number, you either have to enclose the cell contents by braces or to use the `\multicolumn` command as shown in the first line of the example above.

If you want to print a line in bold letters using the `\boldmath` command in math resp. `\bfseries` in text mode the alignment is not correct anymore. This is due to the fact that the bold letters are wider than the normal ones. You can avoid that problem if the font family provides a bold font shape that has the same width as the normal one. For the Computer Modern fonts, such a font shape exists. In text mode, you can access it by using

```
\fontseries{b}\selectfont
```

If you also want to use that font in math mode, you may use the math version `\npbold` by using `\mathversion{npbold}` or `\npboldmath`. In order to save memory, these commands and the `npbold` math version are only available if you call `numprint.sty` using the `boldmath` package option.

An example:

```
\begin{tabular}{lN{12}{3}n{12}{3}}
```

```

\toprule
normal:&
123456123456.123e12&
123456123456.123e12
\\
bold:&
{\fontseries{b}\selectfont} 123456123456.123e12&
{\npboldmath} 123456123456.123e12
\\
bold extended:&
{\bfseries} 123456123456.123e12&
{\boldmath} 123456123456.123e12
\\
\bottomrule
\end{tabular}

```

This produces:

|                |  |  |
|----------------|--|--|
| normal:        | $123,456,123,456.123 \times 10^{12}$                   | $123,456,123,456.123 \times 10^{12}$                   |
| bold:          | <b><math>123,456,123,456.123 \times 10^{12}</math></b> | <b><math>123,456,123,456.123 \times 10^{12}</math></b> |
| bold extended: | <b><math>123,456,123,456.123 \times 10^{12}</math></b> | <b><math>123,456,123,456.123 \times 10^{12}</math></b> |

If you want to add the same text or commands to all lines of a tabular column, you can use the “>” specifier in the declaration of the tabular column, as usual. You have to enclose its argument in an additional pair of braces, as shown in the example below. Unfortunately, the “<” specifier does not work properly. Therefore, the `\npafternum` command is defined that takes one argument which is printed after the number. The following example shows text before and after the number:

`\npafternum`

```

\begin{tabular}{%
>{\before \npafternum{ after}}n[2]{12}{3}%
>{\nprouddigits{4}}n{3}{4}%
>{\color{blue}}n{12}{3}}
\toprule
123456123456.123e12&
12.12345&
123456.23e1
\\
12345.123e12&
12.1&
14561234.562e12
\\
\bottomrule
\end{tabular}

```

This produces:

|        |                                      |       |        |                                 |
|--------|--------------------------------------|-------|--------|---------------------------------|
| before | $123,456,123,456.123 \times 10^{12}$ | after | 12.124 | $123,456.23 \times 10^1$        |
| before | $12,345.123 \times 10^{12}$          | after | 12.100 | $14,561,234.562 \times 10^{12}$ |

As can be seen in the second column, numbers can be rounded in special columns by inserting `\nprouddigits` into a “>” specification. This can be said for all other commands that influence the format of numbers, too.

`\npunit`

Normally, units should not be typeset in the cells of a tabular. But if this is needed, it may be realized using the `\npunit` command, as shown here:

```

\begin{tabular}{>{\npunit{N/mm^2}}n{5}{3}}
  \toprule
  12345.123\\
  12.12\\
  {\npunit{psi}} 234.4\\
  4.3\\
  \bottomrule
\end{tabular}

```

This produces:

|            |                   |
|------------|-------------------|
| 12,345.123 | N/mm <sup>2</sup> |
| 12.12      | N/mm <sup>2</sup> |
| 234.4      | psi               |
| 4.3        | N/mm <sup>2</sup> |

The tabular alignment of the `numprint` package has been tested with the `tabular`, `tabular*`, `array`, `tabularx` [1], and `longtable` [2] environments. It may or may not run with other packages and environments.

## 6.2 The old column types

`column type N` If the `oldcolumn` package option is specified the column types `n` and `N` are defined differently than described in the previous section. The `n` column type aligns the base number to the decimal sign, the `N` column type additionally aligns the exponent.

Use these commands as follows:

```

\tabcsep0mm
\begin{tabular}{|n{5}{3}|N{5}{3}{3}|}
  \hline
  \numprint{123.45e12}& \numprint{123.45e12}\\
  \numprint{12345.678e123}& \numprint{12345.678e123}\\
  \numprint{123.45e12.3}& \numprint{123.45e12.3}\\
  \numprint{12345.678e123.3}& \numprint{12345.678e123.3}\\
  \hline
\end{tabular}

```

This leads to

|                                  |                                  |
|----------------------------------|----------------------------------|
| 123.45 × 10 <sup>12</sup>        | 123.45 × 10 <sup>12</sup>        |
| 12,345.678 × 10 <sup>123</sup>   | 12,345.678 × 10 <sup>123</sup>   |
| 123.45 × 10 <sup>12.3</sup>      | 123.45 × 10 <sup>12.3</sup>      |
| 12,345.678 × 10 <sup>123.3</sup> | 12,345.678 × 10 <sup>123.3</sup> |

The first argument defines the number of digits before the decimal sign, the second the number after. In case of the type `N` the third option defines the number of digits before the decimal sign in the exponent. It is not possible to define the numbers of digits after the decimal sign in the exponent; they are set to zero. Notice that the command `\numprint` has to be written again in each tabular entry, using the old column types.

### 6.3 Alignment in normal text

The alignment of the numbers in tabulars is realized by writing the number inside a box with the specified width. This functionality can also be used outside tabular environments. The `\npdigits{<before>}{<after>}` command switches on the alignment of numbers printed by `\numprint`. The first argument defines the number of digits before the decimal sign while the second argument defines the number of digits after it for the mantissa. Since exponents are normally integer numbers the syntax of the corresponding `\npexponentdigits` command is slightly different. Its syntax is `\npexponentdigits[<after>]{<before>}`. The mandatory argument defines the number of digits before the decimal sign of the exponent. If no optional argument is given, the number of digits after the decimal sign is set to zero. If it is given it defines the number of digits after the decimal sign.

If the `\npdigits` or `\npexponentdigits` commands have been used inside a group the values are reset at the end of the group. Alignment can also be switched off using the `\npnodigits` resp. `\npnoexponentdigits` commands.

## 7 Error messages etc.

By default, `\numprint` produces an error message if the argument uses some invalid characters or if the number format is invalid. Some people use `\numprint` to do strange things and thus use invalid arguments designedly. These people may switch off these error messages by using the package option `warning`.

If you want some debug messages to be written into the log file, use the package option `debug`.

## 8 Advanced customization

### 8.1 Changing the output

Most of the things described in this section are not necessary to be done by hand because the feature “automatic language support”, described in section 5 does this automatically.

#### 8.1.1 Without the `autolanguage` option

By using the commands `\npdecimalsign{<Sign>}`, `\npthousandsep{<Separator>}`, `\npthousandthpartsep{<Separator>}`, and `\npproductsign{<Sign>}`,<sup>11</sup> several separators and symbols can be changed, e.g.,

```
\npdecimalsign{\ensuremath{\cdot}}\npthousandsep{,}\npproductsign{*}%
\numprint{-123456}; \numprint{3,1415927e-3.2}
```

leads to “  $-123,456; 3 \cdot 141,592,7 * 10^{-3 \cdot 2}$ ”.

The `\npthousandsep` both changes the separators before and after the decimal sign. If you want to use different separators, you have to call `\npthousandthpartsep` after `\npthousandsep`.

<sup>11</sup>These command did not have the “np” in older versions. This had to be changed in order to avoid an incompatibility with the french language of babel.

The separators as well as the decimal sign are typeset in the same mode as the number itself (math or text). If you want to guarantee a special mode, you have to use `\ensuremath` for math or either `\mbox`, `\textrm`, or `\text`<sup>12</sup> for text mode.

The product sign, in contrast, is always printed in math mode. Thus, you don't have to add `\ensuremath` to use math commands.

`\global` If using these commands inside a group (`{...}`, `\begingroup... \endgroup`, or an environment) the behaviour of the `\numprint` command is changed only locally (inside the current group). By preceding `\global` the change can be made global inside a group. For example:

```
Local:
\numprint{123e4},
{\npproductsign{\cdot}\numprint{123e4}},
\numprint{123e4}.
Global:
\numprint{123e4},
{\global\npproductsign{\cdot}\numprint{123e4}},
\numprint{123e4}
```

leads to the following:

Local:  $123 \times 10^4$ ,  $123 \cdot 10^4$ ,  $123 \times 10^4$ . Global:  $123 \times 10^4$ ,  $123 \cdot 10^4$ ,  $123 \cdot 10^4$

The current version has the following defaults:

```
\npthousandsep{\,}
\npdecimalsign{.}
\npproductsign{\cdot}
\npunitseparator{\,}
```

`\npunitseparator` The space between the number and the unit is “\,” by default. It can be changed using the command `\npunitseparator{⟨Separator⟩}`, e.g.,

```
\npunitseparator{~}
```

`\npdegreeseparator` By default, no space is added between the number and a degree symbol. You may specify a separator for that using `\npdegreeseparator{⟨Separator⟩}`.

`\npcelsiusseparator` By default, the same space as for normal units is added between the number and °C. You may specify a different separator for that using `\npcelsiusseparator{⟨Separator⟩}`. Note that `\tccentigrade` is not supported by `numprint`.

`\nppercentseparator` By default, the same space as for normal units is added between the number and a percent sign. You may specify a different separator for that using `\nppercentseparator{⟨Separator⟩}`.

### 8.1.2 With the `autolanguage` option

If you are using the `autolanguage` option changes made with the commands described in the previous section get lost at the next change of the language or at `\begin{document}`. Thus, they cannot be used with this option in the way described there.

Thus, you have to redefine the commands that set the language-dependent `numprint` settings. For each known language, a command `\npstyle⟨language⟩` is defined that does the changes, e.g., `\npstyleenglish` for English. This command

`\npstyleenglish`

<sup>12</sup>Provided by `amsmath`.

is defined as follows:

```
\newcommand*\npstyleenglish{%
  \npthousandsep{,}%
  \npdecimalsign{.}%
  \npproductsign{\times}%
  \npunitseparator{\,}%
  \npdegreeseparator{}%
  \npcelsiusseparator{\nprt@unitsep}%
  \nppercentseparator{\nprt@unitsep}%
}
```

If you want to use different settings for this language, you have two possibilities:

1. Copy the definition for `\npstyle<language>` from the style file and change it according to your wishes, for example:<sup>13</sup>

```
\renewcommand*\npstyleenglish{%
  \npthousandsep{,}%
  \npdecimalsign{{\cdot}}%
  \npproductsign{\times}%
  \npunitseparator{\,}%
  \npdegreeseparator{}%
  \npcelsiusseparator{\nprt@unitsep}%
  \nppercentseparator{\nprt@unitsep}%
}
```

2. Another way to add different settings to a language is to use `\g@addto@macro` to append commands to an existing `\npstyle<language>` command, e.g.,

```
\makeatletter
\g@addto@macro\npstyleenglish{%
  \nppercentseparator{}%
}%
\makeatother
```

This has the advantage that changes in the original command are not lost by using a copy. The disadvantage is that some commands may be called twice which is slightly slower.

The changes take effect when the style command is called the next time; this is when the language is changed the next time or at `\begin{document}`.

If the language you are using is not yet supported by `numprint` you may add support for it in the preamble of your document.

`\npaddtolanguage`

The simplest case is a language that uses the same settings as one of the languages, already supported. If, for instance, you want to use Danish with the same settings as German, you just have to add

```
\npaddtolanguage{danish}{german}
```

to the preamble of your document.

If you, instead, want to use different settings, define a corresponding style command. Let's take Danish as an example, again. Define a command

---

<sup>13</sup>Notice that you have to use `\renewcommand*` instead of `\newcommand*`.

`\npstyledanish` which defines everything you want to change against the default (I choose some strange values for clearness):

```
\newcommand*\npstyledanish{%
  \npthousandsep{.}%
  \npdecimalsign{\ensuremath{\cdot}}%
  \npproductsign{*}%
  \npunitseparator{~}%
  \npdegreeseperator{}%
  \npcelsiusseparator{\nprt@unitsep}%
  \nppercentseparator{\nprt@unitsep}%
}
```

In addition, append the call of this command to the language-switching command for Danish:

```
\npaddtolanguage{danish}{danish}
```

## 8.2 Changing the argument parsing

It has been said above that thousand separators are not allowed in the argument of the `\numprint` command. This can be customized by the user.

For most elements in the input, `\numprint` uses lists that contain the corresponding characters. The macro `\nprt@dotlist` contains the characters interpreted as decimal signs. It is defined as followed:

```
\newcommand*\nprt@dotlist{.,}
```

If you, for example, only want to allow the dot as decimal sign, redefine the list:

```
\renewcommand*\nprt@dotlist{.}
```

If you want to do this in your document rather than in the configuration file `numprint.cfg`—see section 9.3—you have to enclose this by `\makeatletter` and `\makeatother`.

`\nprt@explist` The `\nprt@explist` command contains the characters interpreted as delimiter between mantissa and exponent. By default it contains “eEdD”. Redefine it as `\nprt@dotlist`.

`\nprt@ignorelist` The `\nprt@ignorelist` command contains a list of characters that are ignored in the input (in addition to spaces, “\”, “,”, and “~”). It is empty by default. If you, for example, only want to allow dots as decimal sign and commas may occur as thousand separators in the input, you may use following redefinition:

```
\renewcommand*\nprt@dotlist{.}
\renewcommand*\nprt@ignorelist{,}
```

Then, “,” is ignored in the input and “.” is interpreted as decimal sign. For example,

```
\makeatletter
{\renewcommand*\nprt@dotlist{.}%
 \renewcommand*\nprt@ignorelist{,}%
 \numprint{12,234.123,45e1,2,3.0}}
\makeatother
```

leads to “12,234.123,45 × 10<sup>123.0</sup>”.

`\nprt@signlist` The `\nprt@signlist` command contains the list of known signs. By default, it is set to “+−\pm”. You may change the list of accepted signs by redefining `\nprt@signlist`. If, for instance, the letter “\*” is intended to be a sign, just type in

```
\renewcommand*\nprt@signlist{+-\pm *}
```

This character is typeset when using it as sign. But this indicates one problem: The sign might differ between text and math mode, as show in the following example: In text mode, `\numprint{*1234}` occurs as “\*1,234” while is is typeset as “\*1,234” in math mode. To avoid that, you may define a command that prints the sign. This command must have a name according to `\nprt@list@⟨sign⟩`. In this case, you have to define `\nprt@list@*`. Since the sign might be arbitrary characters, you should define the command as follows:

`\nprt@sign@*`

```
\expandafter\newcommand\csname nprt@sign@*\endcsname{\ensuremath{*}}
```

With this command, `\numprint{*1234}` occurs as “\*1,234” in text mode and as “\*1,234” in math mode.

Because of this mechanism to print a sign, it is not possible to use other macro names than `\pm` for signs.<sup>14</sup> You have to use single characters as the shown “\*”.

## 9 Some tricks

### 9.1 Let the signs depend on the mode

`\nprt@sign@+`  
`\nprt@sign@-`  
`\nprt@sign@+-` The default signs are typeset in math mode independently of the mode the number ist printed. If you are using a font in which the sings of text and math mode differ much, this may be unsatisfactory. Then, you can typeset different signs for text and math mode. Therefore, it is used that the default signs use the same macros as user signs, described in section 8.2. They are defined as follows:

```
\expandafter\newcommand\csname nprt@sign@+\endcsname{\ensuremath{+}}
\expandafter\newcommand\csname nprt@sign@-\endcsname{\ensuremath{-}}
\expandafter\newcommand\csname nprt@sign@+-\endcsname{\ensuremath{\pm}}
```

If you, for instance, don’t want to use the math minus for numbers in text mode but another character, you may redefine `\nprt@sign@-`:

```
\expandafter\renewcommand\csname nprt@sign@-\endcsname{%
  \ifmmode -\else ---\fi}
```

With this definition, `\numprint{-1234}` leads to “—1,234” resp. “−1,234” in text resp. math mode.

### 9.2 Typing negative numbers in red

If you want to print negative number in red colors, you can use the `\nprt@sign@-` command, too. The following example shows how to do it:

```
\usepackage{color}
```

---

<sup>14</sup>`\pm` is handled separately.

```

\makeatletter
\expandafter\renewcommand\csname nprt@sign@-\endcsname{%
  \color{red}\ensuremath{-}}
\makeatother

```

With this definition,

```

\numprint{1234}, \numprint{-1234},
\numprint{1234e-123}, \numprint{-1234e123}.

```

leads to “1,234,  $-1,234$ ,  $1,234 \times 10^{-123}$ ,  $-1,234 \times 10^{123}$ .”<sup>15</sup> To avoid a negative exponent being printed in red for a positive mantissa, a hack is included in the page which is described in appendix F.9, page 54.

### 9.3 Configuration file

If your L<sup>A</sup>T<sub>E</sub>X installation provides a file `numprint.cfg` in the T<sub>E</sub>X search path, it is loaded by `numprint.sty` as last action. Thus, you may add all changes and extensions, new languages for instance, into this file.

## A Compatibility to older versions

In most cases, the user macros of this package (the macros not containing a “@” in their name) should be compatible to older versions. The parsing of the argument has been improved that some arguments of `\numprint` may be accepted or not in contrast to the older version.

The spacing of aligned numbers has also been corrected. Thus, this is be incompatible to the older version if you are using alignment in the exponent or math environments other than `\textstyle`.

## B Lists of options and commands

This section contains lists of all package options resp. available commands. Items that belong together and may be exclusive are printed in groups together.

### B.1 Package options

The default values are marked by \*.

|                              |  |
|------------------------------|--|
| <code>warning</code>         | Produce warnings rather than error messages.         |
| <code>error*</code>          | Produce error messages rather than warnings.         |
| <code>autolanguage</code>    | Switch the settings language dependent.              |
| <code>noautolanguage*</code> | Fixed settings.                                      |
| <code>sepfour*</code>        | Separator for four-digit numbers.                    |
| <code>nosepfour</code>       | No separator for four-digit numbers.                 |
| <code>admissingzero*</code>  | Add missings zeros before or after the decimal sign. |

---

<sup>15</sup>Whether you can see the effect in the output depends on the viewer; in PostScript and PDF the red color works, in many dvi viewers, it doesn't.

|                                 |   |
|---------------------------------|---|
| <code>noadmissingzero</code>    | Don't do that.  |
| <code>addplus</code>            | Add a plus to a number without a sign.  |
| <code>noaddplus*</code>         | Don't do that.  |
| <code>addplusexponent</code>    | Add a plus to a number without a sign in exponents.   |
| <code>noaddplusexponent*</code> | Don't do that.  |
| <code>oldcolumntypes</code>     | Define the old column types that need to use the <code>\numprint</code> inside the tabular. |
| <code>newcolumntypes*</code>    | Use the new column types.   |
| <code>boldmath</code>           | Define the <code>npbold</code> math version.  |
| <code>np</code>                 | Define the shortcut <code>\np</code> for <code>\numprint</code> .                           |
| <code>debug</code>              | Produce debug information in the log file.  |

## B.2 Commands

|                                   |  |
|-----------------------------------|--|
| <code>\npfourdigitsep</code>      | Switch on separating four-digit numbers.   |
| <code>\npfourdigitnosep</code>    | Switch off separating four-digit numbers.  |
| <code>\npadmissingzero</code>     | Switch on adding missings zeros before or after the decimal sign.                          |
| <code>\npnoadmissingzero</code>   | Switch off adding missings zeros before or after the decimal sign.                         |
| <code>\npaddplus</code>           | Add a plus to a number without a sign.   |
| <code>\npnoaddplus</code>         | Don't do that.   |
| <code>\npaddplusexponent</code>   | Add a plus to the exponent when it has no sign.  |
| <code>\npnoaddplusexponent</code> | Don't do that.   |
| <code>\np</code>                  | Shortcut for <code>\numprint</code> (only available with package option <code>np</code> ). |
| <code>\numprint</code>            | Typesets a number (the package's main command).  |
| <code>\npdecimalsign</code>       | Change the decimal sign.   |
| <code>\npthousandsep</code>       | Change the thousand separator (before and after the decimal sign).                         |
| <code>\npthousandspartsep</code>  | Change the thousand separator (only after the decimal sign).                               |
| <code>\npproductsign</code>       | Change the product sign.   |
| <code>\npunitseparator</code>     | Change the separator between a number and a unit.  |
| <code>\npdegreeseparator</code>   | Change the separator between a number and a degree symbol.                                 |
| <code>\npcelsiusseparator</code>  | Change the separator between a number and °C.  |
| <code>\nppercentseparator</code>  | Change the separator between a number and a percent sign.                                  |
| <code>\nprounddigits</code>       | Declare how many digits will be printed after the decimal sign.                            |
| <code>\npnoround</code>           | Switch off rounding and print numbers as given.  |

|                                  |  |
|----------------------------------|--|
| <code>\nproundexpdigits</code>   | Declare how many digits will be printed after the decimal sign in the exponent.                      |
| <code>\npnoroundexp</code>       | Switch off rounding for the exponent.  |
| <code>\nplpadding</code>         | Declare up to how many digits the number will be padded at the lefthand side.                        |
| <code>\npnolpadding</code>       | Switch off padding.  |
| <code>\npreplacenu11</code>      | Replace the after-decimal-sign part by another text if it is zero.                                   |
| <code>\npprintnull</code>        | Print zeros after the decimal sign.  |
| <code>\npdigits</code>           | Switch on aligned number printing with given digits before and after the decimal sign.               |
| <code>\npnodigits</code>         | Print numbers in a box that is as wide as needed by the number.                                      |
| <code>\npexponentdigits</code>   | Switch on aligned printing of the exponent.  |
| <code>\npnoexponentdigits</code> | Switch alignment off for the exponent.   |
| <code>\npaddtolanguage</code>    | Adds language definitions to the extras section of a <code>babel</code> language.                    |
| <code>\npstyledefault</code>     | Defines the settings in standard format.   |
| <code>\npstylegerman</code>      | Defines the German number format.  |
| <code>\npstyleenglish</code>     | Defines the English number format.   |
| <code>\npmakebox</code>          | Command similar to <code>\makebox</code> but with text instead of length in first optional argument. |
| <code>\npboldmath</code>         | Bold math version with digits with the same width as normal digits.                                  |
| <code>\npafternum</code>         | Puts text after the number in tabulars.  |
| <code>\npunit</code>             | Sets the unit in tabulars.   |

## C Known bugs

- When aligning the exponent for tabulars, the distance between the “10” and the exponent is too small.
- Printing negative numbers in red does not work. Only the minus sign is printed in red. When was this bug introduced?

## D To do

- Add more languages to the automatic international support.
- Add support for “<” in tabular definitions.
- Avoid many of the temporary variables.
- Add support for numbers in tabulars that are right aligned or centered.

## E Acknowledgements

- Tilman Finke, tfinke@it-and-law.de, had the idea of rounding numbers.
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- Portuguese support by Vilar Camara Neto and Luis.
- Dutch support by Ralph Hendriks.
- French support by Daniel Flipo.

## References

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- [2] Carlisle, David: *The longtable package*, version 4.10, 2000. CTAN:macros/latex/contrib/longtable/.
- [3] Guthöhrlein, Eckhart: *The rccol package*, version 1.1a, 2000. CTAN:macros/latex/contrib/rccol/.

## F The implementation

Heading of the package:

```
1 \NeedsTeXFormat{LaTeX2e}
2 \ProvidesPackage{numprint}
3 [2007/01/08 v1.37 Print numbers (HH)]
```

### F.1 Load packages

Load package array.sty for the new column types.

```
4 \RequirePackage{array}
```

### F.2 Package options and settings

Define a boolean if the first digit is separated in a four digit number. Default is true for compatibility with older versions.

```
5 \newif\ifnprt@numsepfour
```

Show warnings or errors?

```
6 \newif\ifnprt@errormessage
```

Add missing zeros?

```
7 \newif\ifnprt@addmissingzero
```

Add missing plus signs?

```
8 \newif\ifnprt@addplus@mantissa
```

```
9 \newif\ifnprt@addplus@exponent
```

Switch the style depending on the language automatically?

```
10 \newif\ifnprt@autolanguage
```

Old or new column types?

```
11 \newif\ifnprt@newcolumnntype
```

Declare new math type?

```
12 \newif\ifnprt@npbold
```

`\npfourdigitsep` Switch separating of the fourth digit on.

```
13 \newcommand*\npfourdigitsep{\nprt@numsepfourtrue}%
```

`\npfourdigitnosep` Switch separating of the fourth digit off.

```
14 \newcommand*\npfourdigitnosep{\nprt@numsepfourfalse}%
```

`\npaddmissingzero` Add a missing zero before or after decimal sign.

```
15 \newcommand*\npaddmissingzero{\nprt@addmissingzerotrue}%
```

`\npnoaddmissingzero` Don't add a missing zero before or after decimal sign.

```
16 \newcommand*\npnoaddmissingzero{\nprt@addmissingzerofalse}%
```

`\npaddplus` Add a plus to the mantissa if no sign is given.

```
17 \newcommand*\npaddplus{\nprt@addplus@mantissatrue}%
```

`\npnoaddplus` Don't add a plus to the mantissa if no sign is given.

```
18 \newcommand*\npnoaddplus{\nprt@addplus@mantissafalse}%
```

`\npaddplusexponent` Add a plus to the exponent if no sign is given.

```
19 \newcommand*\npaddplusexponent{\nprt@addplus@exponenttrue}%
```

`\npnoaddplusexponent` Don't add a plus to the exponent if no sign is given.

```
20 \newcommand*\npnoaddplusexponent{\nprt@addplus@exponentfalse}%
```

Declare options. `nosepfour` switches seperating of the fourth digit off, `sepfour` switches it on. Default is on four compatibility reasons with older versions.

```
21 \DeclareOption{nosepfour}{\npfourdigitnosep}
```

```
22 \DeclareOption{sepfour}{\npfourdigitsep}
```

Add missing zeros after decimal sign?

```
23 \DeclareOption{noaddmissingzero}{\npnoaddmissingzero}
```

```
24 \DeclareOption{addmissingzero}{\npaddmissingzero}
```

Add a plus sign to the mantissa if no sign is given?

```
25 \DeclareOption{noaddplus}{\npnoaddplus}
```

```
26 \DeclareOption{addplus}{\npaddplus}
```

Add a plus sign to the exponent if no sign is given?

```
27 \DeclareOption{noaddplusexponent}{\npnoaddplusexponent}
```

```
28 \DeclareOption{addplusexponent}{\npaddplusexponent}
```

Add missing zeros after decimal sign?

```
29 \DeclareOption{noautolanguage}{\nprt@autolanguagefalse}
```

```
30 \DeclareOption{autolanguage}{\nprt@autolanguagetrue}
```

`\np` Define a shortcut for the `\numprint` command?

```
31 \DeclareOption{np}{\newcommand*np{\numprint}}
```

Produce warnings or errors?

```
32 \DeclareOption{oldcolumnntypes}{\nprt@newcolumnntypefalse}
33 \DeclareOption{newcolumnntypes}{\nprt@newcolumnntypetrue}
```

Declare new math type?

```
34 \DeclareOption{boldmath}{\nprt@npboldtrue}
```

Produce warnings or errors?

```
35 \DeclareOption{warning}{\nprt@errormessagefalse}
36 \DeclareOption{error}{\nprt@errormessage>true}
```

Generate some debug information to the log file?

```
37 \newcommand*nprt@debug[1]{
38 \DeclareOption{debug}{%
39 \renewcommand*nprt@debug[1]{\PackageInfo{numprint}{#1}}%
40 }
```

Execute default options and the given options.

```
41 \ExecuteOptions{sepfour,admissingzero,error,noautolanguage,newcolumnntypes}
42 \ProcessOptions\relax
```

Define commands to change the output of the `\numprint` command.

`\npdecimalsign` Change the decimal sign. In English it is normally “.”, in German “;”. The additional pair of braces `{}` prevents from inserting additional space in math mode, e.g.,  $1,2$  versus  $1.2$ .

```
43 \newcommand*npdecimalsign[1]{\def\nprt@decimal{#1}}
```

`\npthousandsep` Change the thousand separator. In English it often is “,”, in German “.” or “” (`\,`). Here again the additional `{}` is used as above. This command changes both the sign before and after the decimal sign. If you want a different sign after the comma you have to call `\npthousandthpartsep` after `\npthousandsep`.

```
44 \newcommand*npthousandsep[1]{\def\nprt@separator@before{#1}%
45 \def\nprt@separator@after{#1}}
```

`\npthousandthpartsep` Change the thousand separator after the decimal sign.

```
46 \newcommand*npthousandthpartsep[1]{\def\nprt@separator@after{#1}}
```

`\npproductsign` Change the product sign that is printed in numbers with exponent like  $123 \times 10^4$ . Normally it is `\cdot`. In American texts sometimes `\times`. The two pairs of braces `{}` ensure the correct spacing on the left and right side of the product sign, e.g.,  $3 \cdot 4$  versus  $3 \times 4$ .

```
47 \newcommand*npproductsign[1]{\def\nprt@prod{\ensuremath{#1}}}
```

`\npunitseparator` Change the separator between number and unit. Here again the additional `{}` is used as above.

```
48 \newcommand*npunitseparator[1]{\def\nprt@unitsep{#1}}
```

`\npdegreeseparator` Change the separator between number and  $^\circ$ . Here again the additional `{}` is used as above.

```
49 \newcommand*npdegreeseparator[1]{\def\nprt@degreesep{#1}}
```

`\npcelsiusseparator` Change the separator between number and °C. Here again the additional {} is used as above.  
50 `\newcommand*\npcelsiusseparator[1]{\def\nprt@celsiussep{#1}}`

`\nppercentseparator` Change the separator between number and %. Here again the additional {} is used as above.  
51 `\newcommand*\nppercentseparator[1]{\def\nprt@percentsep{#1}}`

`\nprt@fillnull` Defines command #1 with a number of #2 zeros filled. This should reside in Sect. F.7 but is called before.  
52 `\def\nprt@fillnull#1#2{%`  
53 `\@tempcnta=-1`  
54 `\loop`  
55 `\g@addto@macro{#1}{0}%`  
56 `\advance\@tempcnta by 1`  
57 `\ifnum\@tempcnta<#2`  
58 `\repeat`  
59 `}`

`\nprounddigits` Define a command that sets a count of digits after which the number is rounded. This command defines `\nprt@rounddigits` that stores the count and `\nprt@roundnull` that contains of `\nprt@rounddigits` “o” digits.  
60 `\newcommand\nprounddigits[1]{%`  
61 `\def\nprt@rounddigits{#1}%`  
62 `\def\nprt@roundnull{}`  
63 `\nprt@fillnull{\nprt@roundnull}{#1}%`  
64 `}`

`\npnoround` A command to switch off rounding.  
65 `\newcommand\npnoround{\nprounddigits{-1}}`

Don’t round by default.  
66 `\npnoround`

`\nproundexpdigits` The same for exponents.  
`\npnoroundexp` 67 `\newcommand\nproundexpdigits[1]{%`  
68 `\def\nprt@roundexpdigits{#1}%`  
69 `\def\nprt@roundexpnull{}`  
70 `\nprt@fillnull{\nprt@roundexpnull}{#1}%`  
71 `}`  
72 `\newcommand\npnoroundexp{\nproundexpdigits{-1}}`  
73 `\npnoroundexp`

`\nplpadding` This command sets the total counts of digits a number should contain. The missing digits are filled with the character from the second argument (which is o by default).  
74 `\newcommand\nplpadding[2][0]{%`  
75 `\def\nprt@lpadding{#2}%`  
76 `\def\nprt@lpadchar{#1}%`  
77 `}`

`\npnolpadding` The command to switch of padding.  
78 `\newcommand*\npnolpadding{\nplpadding[\@empty]{-1}}`

Don't pad by default.

```
79 \npnolpadding
```

`\npreplacenull` Optionally, one or more zeros after the decimal sign can be replaced by other text, e.g., “—”.

```
80 \newcommand*\npreplacenull[1]{\def\nprt@replacenull{#1}}
```

`\npprintnull` Switch off replacement, again.

```
81 \newcommand*\npprintnull{\let\nprt@replacenull=\@empty}
```

Print the zero by default.

```
82 \npprintnull
```

`\npunitcommand` This command is used to typeset the unit.

```
83 \newcommand*\npunitcommand[1]{\ensuremath{\mathrm{#1}}}
```

`\npdigits` With this command the user can switch to aligned printing. The first parameter stands for the digits before the decimal sign and the second for the digits after it.

```
84 \newif\ifnprt@mantissa@fixeddigits
85 \newcommand*\npdigits[2]{%
86   \edef\nprt@mantissa@fixeddigits@before{#1}%
87   \edef\nprt@mantissa@fixeddigits@after{#2}%
88   \nprt@mantissa@fixeddigitstrue
89 }
```

Initialize the numbers.

```
90 \def\nprt@mantissa@fixeddigits@before{-1}%
91 \def\nprt@mantissa@fixeddigits@after{-1}%
```

`\npnodigits` Switch back to normal printing.

```
92 \newcommand*\npnodigits{\nprt@mantissa@fixeddigitsfalse}
```

`\npexponentdigits` With this command the user can switch to aligned printing of the exponent. The parameter stands for the digits before the decimal sign.

```
93 \newif\ifnprt@exponent@fixeddigits
94 \newcommand*\npexponentdigits[2][0]{%
95   \edef\nprt@exponent@fixeddigits@before{#2}%
96   \edef\nprt@exponent@fixeddigits@after{#1}%
97   \nprt@exponent@fixeddigitstrue
98 }
```

Initialize the numbers.

```
99 \def\nprt@exponent@fixeddigits@before{-1}%
100 \def\nprt@exponent@fixeddigits@after{-1}%
```

`\npnoexponentdigits` Switch back to normal printing.

```
101 \newcommand*\npnoexponentdigits{\nprt@exponent@fixeddigitsfalse}
```

### F.3 Error and warning messages

Define a boolean which helps `\numprint` to detect errors.

```
102 \newif\ifnprt@argumenterror
```

`\nprt@error` Define `\nprt@error{<Message>}{<Help text>}` which prints a warning resp. an error message, depending on the package options `warning` and `error`.

```
103 \newcommand\nprt@error[2]{%
104   \ifnprt@errormessage
105     \PackageError{numprint}{#1}{#2}%
106   \else
107     \PackageWarning{numprint}{#1}%
108   \fi
```

The boolean is set to “true”. Then, `\numprint` knows that an error occurred.

```
109   \nprt@argumenterrortrue
110 }
```

### F.4 String parsing

The `\IfCharInString` package does not work in the tabular alignment context. Thus, define an own command `\nprt@ifCharInString` that does the same.

```
\nprt@charfound
```

```
111 \newif\ifnprt@charfound
```

```
\nprt@ifCharInString
```

```
????
112 \newcommand*\nprt@ifCharInString[2]{%
113   \nprt@charfoundfalse
114   \begingroup
115     \def\nprt@searchfor{#1}%
116     \edef\nprt@argtwo{#2}%
117     \expandafter\nprt@@ifCharInString\nprt@argtwo\@empty\@empty
118   \endgroup
119   \ifnprt@charfound
120     \expandafter\@firstoftwo
121   \else
122     \expandafter\@secondoftwo
123   \fi
124 }
```

```
\nprt@@ifCharInString
```

```
????
125   \def\nprt@@ifCharInString#1#2\@empty{%
126     \def\nprt@argone{#1}%
127     \edef\nprt@argtwo{#2}%
128     \ifx\nprt@searchfor\nprt@argone
129       \global\nprt@charfoundtrue
130     \else
131       \ifx\nprt@argtwo\@empty
132         \else
133           \nprt@@ifCharInString#2\@empty
134         \fi
135       \fi
136   }
```

## F.5 Parsing of the `\numprint` argument

|                                   |  |
|-----------------------------------|--|
| <code>\nprt@plus@test</code>      | Define the signs as commands. This is necessary to be able to compare them with  |
| <code>\nprt@minus@test</code>     | other characters.  |
| <code>\nprt@plusminus@test</code> | <pre> 137 \newcommand*\nprt@plus@test{+} 138 \newcommand*\nprt@minus@test{-} 139 \newcommand*\nprt@plusminus@test{\pm} </pre>  |
| <code>\nprt@numberlist</code>     | Define lists of valid characters for different elements of numbers for parsing the   |
| <code>\nprt@dotlist</code>        | mandatory argument of the <code>\numprint</code> command. It has nothing to do with the  |
| <code>\nprt@explist</code>        | output. <code>\nprt@numberlist</code> contains digits, <code>\nprt@dotlist</code> valid decimal signs,   |
| <code>\nprt@signlist</code>       | <code>\nprt@explist</code> the characters that start the exponent, and <code>\nprt@signlist</code> the   |
|                                   | valid signs, where “+−” as alias for “\pm” does not have to be specified separately.   |
|                                   | <pre> 140 \newcommand*\nprt@numberlist{0123456789} 141 \newcommand*\nprt@dotlist{.,} 142 \newcommand*\nprt@explist{eEdD} 143 \newcommand*\nprt@signlist{+-\pm} 144 \newcommand*\nprt@ignorelist{} </pre> |
|                                   | Counters for the number of digits before and after the decimal sign of the mantissa.   |
|                                   | <pre> 145 \newcounter{nprt@mantissa@digitsbefore}% 146 \newcounter{nprt@mantissa@digitsafter}% </pre>  |
|                                   | Counters for the number of digits before and after the decimal sign of the exponent.   |
|                                   | <pre> 147 \newcounter{nprt@exponent@digitsbefore}% 148 \newcounter{nprt@exponent@digitsafter}% </pre>  |
|                                   | Boolean to store if an exponent will be printed.   |
|                                   | <pre> 149 \newif\ifnprt@expfound </pre>  |
|                                   | Boolean to store if mantissa resp. exponent contain a decimal sign.  |
|                                   | <pre> 150 \newif\ifnprt@mantissa@decimalfound 151 \newif\ifnprt@exponent@decimalfound </pre>   |
| <code>\nprt@testsign</code>       | Define <code>\nprt@testsign{&lt;Number type&gt;}{&lt;Number&gt;}</code> which tests wheather a   |
|                                   | sign is given and then starts <code>\nprt@testnumber</code> (the call actually is done by  |
|                                   | <code>\nprt@@testsign</code> ).  |
|                                   | <pre> 152 \newcommand*\nprt@testsign[2]{% </pre>   |
|                                   | First, store the expanded arguments in macros.   |
|                                   | <pre> 153 \edef\nprt@commandname{#1}% 154 \edef\nprt@tmp{#2}% </pre>   |
|                                   | Call the working command <code>\nprt@@testsign</code> . The large number of <code>\expandafter</code>  |
|                                   | calls is necessary to ensure that the second to fourth argument are already ex-  |
|                                   | expanded (thus, #2 and #3 are single characters). Append enough <code>\@empty</code> to ensure   |
|                                   | the argument-end marker is found even for an empty number.   |
|                                   | <pre> 155 \expandafter\nprt@@testsign\expandafter{% 156 \expandafter\nprt@commandname\expandafter}% 157 \nprt@tmp\@empty\@empty\@empty\@empty 158 } </pre>   |
| <code>\nprt@@testsign</code>      | The first argument is the Number type (“mantissa” or “exponent”). Because it is  |
|                                   | longer than one character, it has to be enclosed in braces when calling this function  |
|                                   | (see the previous code line). The arguments #2 to #4 are the given number, where   |

#2 and #3 contain of the first resp. second character of the number, while #4 contains the rest.

```
159 \def\nprt@@testsign#1#2#3#4\@empty%
```

Store the first argument to a macro.

```
160 \edef\nprt@commandname{#1}%
```

Define the macros that store the digits before respectively after the decimal sign. They are filled digit by digit and start empty.

```
161 \expandafter\xdef\csname nprt@#1@before\endcsname{\@empty}%
```

```
162 \expandafter\xdef\csname nprt@#1@after\endcsname{\@empty}%
```

Yet, no digits are stored.

```
163 \setcounter{nprt@#1@digitsbefore}{0}%
```

```
164 \setcounter{nprt@#1@digitsafter}{0}%
```

Test wheather the first character of the number, #2, contains a sign symbol which is listed in \nprt@signlist.

```
165 \nprt@ifCharInString{#2}{\nprt@signlist}{%
```

If yes, store that sign in the command \nprt@(<#2>)@sign.

```
166 \expandafter\xdef\csname nprt@#1@sign\endcsname{#2}%
```

If the sign is a “+” the second character of the number may be a “-” to replace that combination by \pm. Thus, do an extra handling of that case.

```
167 \expandafter\ifx\csname nprt@#1@sign\endcsname\nprt@plus@test
```

```
168 \def\nprt@tmp{#3}%
```

```
169 \ifx\nprt@tmp\nprt@minus@test
```

The second character, #3, is a “-”, thus redefine \nprt@(<#2>)@sign to \pm.

```
170 \expandafter\xdef\csname nprt@#1@sign\endcsname{+-}%
```

The digits start at the third character of the number string which is #4. Start \nprt@testnumber to parse the digits of the number if a number is given after the given sign “+-”. If not, empty \nprt@(<#1>) that \numprint can determine that only a sign has been given.

```
171 \def\nprt@tmp{#4}%
```

```
172 \ifx\nprt@tmp\@empty
```

```
173 \expandafter\edef\csname nprt@#1\endcsname{\@empty}%
```

```
174 \else
```

```
175 \expandafter\nprt@testnumber\expandafter\nprt@commandname#4\@empty
```

```
176 \fi
```

```
177 \else
```

If there is a single sign character “+”, the digits start at #3. Start \nprt@testnumber to parse the digits of the number if a number is given after the given sign “+”. If not, empty \nprt@(<#1>) that \numprint can determine that only a sign has been given.

```
178 \ifx#3\@empty
```

```
179 \expandafter\edef\csname nprt@#1\endcsname{\@empty}%
```

```
180 \else
```

```
181 \expandafter\nprt@testnumber\expandafter\nprt@commandname#3#4\@empty
```

```
182 \fi
```

```
183 \fi
```

```
184 \else
```

If the sign is a “\pm” store “+-” as sign.

```
185     \expandafter\ifx\csname nprt@#1@sign\endcsname\nprt@plusminus@test
186     \expandafter\xdef\csname nprt@#1@sign\endcsname{+-}%
187     \fi
```

If there is a single sign character other than “+”, the digits start at #3. Start \nprt@testnumber to parse the digits of the number if a number is given after the given sign. If not, empty \nprt@{#1} that \numprint can determine that only a sign has been given.

```
188     \ifx#3\@empty
189     \expandafter\edef\csname nprt@#1\endcsname{\@empty}%
190     \else
191     \expandafter\nprt@testnumber\expandafter\nprt@commandname#3#4\@empty
192     \fi
193     \fi
194 }{%
```

If there is no sign, set \nprt@{#2}@sign empty.

```
195     \expandafter\xdef\csname nprt@#1@sign\endcsname{\@empty}%
```

The digits start at #2. Start \nprt@testnumber to parse the digits of the number.

```
196     \expandafter\nprt@testnumber\expandafter\nprt@commandname#2#3#4\@empty
197 }%
198 }
```

\nprt@testnumber As with \nprt@@testsign, the first argument is the Number type, while the second and third arguments contain the number. #2 contains the first character of the remaining number string, #3 the rest.

```
199 \def\nprt@testnumber#1#2#3\@empty{%
```

Store the arguments in macros.

```
200 \edef\nprt@commandname{#1}%
201 \edef\nprt@argthree{#3}%
```

Test whether the current character is a valid character for a real number (say a digit or a decimal sign).

```
202 \nprt@ifcharinstring{#2}{\nprt@numberlist\nprt@dotlist}{%
```

If this is the case, continue testing. If the current character is a decimal sign, set the boolean \ifnprt@{Number type}@decimalfound that a decimal sign has been found. If this has been done before, the number contains two decimal signs which is not allowed, thus, generate an error message.

```
203 \nprt@ifcharinstring{#2}{\nprt@dotlist}{%
204 \csname ifnprt@#1@decimalfound\endcsname
205 \nprt@error{More than one decimal sign used}{The mantissa
206 or the exponent may only contain a maximum of one decimal
207 sign (one of the list ‘\nprt@dotlist’)}%
208 \else
209 \csname nprt@#1@decimalfoundtrue\endcsname
210 \fi
211 }{%
```

If the current character is no decimal sign it has to be a digit. If the decimal sign has been found before, this digit is in the real part of the number. Then, add it at the end of the after-decimal-sign part. Also, increase the number of found digits.

```

212     \csname ifnprt@#1@decimalfound\endcsname
213     \expandafter\g@addto@macro\csname nprt@#1@after\endcsname{#2}%
214     \stepcounter{nprt@#1@digitsafter}%
215     \else
    If the decimal sign has not been found before, this digit is in the integer part of
    the number. Then, add it at the end of the before-decimal-sign part.
216     \expandafter\g@addto@macro\csname nprt@#1@before\endcsname{#2}%
217     \stepcounter{nprt@#1@digitsbefore}%
218     \fi
219 }%
    If the next character is not \@empty and thus, the end of the number is not reached,
    start \nprt@testnumber resursively to parse the next character.
220 \ifx\nprt@argthree\@empty
221 \else
222 \expandafter\nprt@testnumber\expandafter\nprt@commandname#3\@empty
223 \fi
224 }{%
    The current character is neither a digit nor a decimal sign. Thus, it is a invalid
    character; produce an error message.
225 \nprt@error{Invalid number format. Printing the
226 argument\MessageBreak
227 verbatim}{Something is wrong in the format of the number}%
228 }%
229 }

```

`\nprt@testcharacter` This macro parses the whole mandatory argument of `\numprint`. This means it is tested on invalid characters and on a mantissa and an exponent. The first argument is the current character while #2 is the rest of the argument, not parsed yet.

```

230 \def\nprt@testcharacter#1#2\@empty{%
    Store the second argument to a macro.
231 \edef\nprt@argtwo{#2}%
    Test wheather the current character is a valid one.
232 \nprt@ifCharInString{#1}{%
233 \nprt@numberlist\nprt@dotlist\nprt@explist\nprt@signlist\nprt@ignorelist}{%
    Yes, it is valid.
    Now, test wheather it is one of the ignored characters.
234 \nprt@ifCharInString{#1}{\nprt@ignorelist}{%
235 \nprt@debug{Character '\noexpand#1' ignored}%
236 }{%
    Yes, it is valid.
    Now, test wheather it is one of the characters that start the exponent. If yes,
    set \ifnprt@expfound to "true". If in addition, this has been done before, you
    have used more than one exponent starting character; produce an error message.
237 \nprt@ifCharInString{#1}{\nprt@explist}{%
238 \ifnprt@expfound
239 \nprt@error{Character for exponent ('\nprt@explist') used
240 more than once}{The argument of \string\numprint\space may
241 only contain one of following characters: '\nprt@explist'}%

```

```

242     \fi
243     \nprt@expfoundtrue
244 }{%
```

If the current character is not an exponent-starting character it is either a part of the mantissa or the exponent, depending on whether the exponent has been started before. Add the current character to the corresponding command that stores the mantissa resp. the exponent.

```

245     \ifnprt@expfound
246     \g@addto@macro\nprt@exponent{#1}%
247     \else
248     \g@addto@macro\nprt@mantissa{#1}%
249     \fi
250 }%
251 }%
```

If we have not reached the end of the argument, call `\nprt@testcharacter` recursively.

```

252     \ifx\nprt@argtwo@empty
253     \else
254     \nprt@testcharacter#2@empty@empty@empty
255     \fi
256 }{%
```

If the character is not valid produce an error message.

```

257     \nprt@error{Invalid characters ‘#1’ in mandatory argument
258     of\MessageBreak
259     \string\umprint. Allowed are\MessageBreak
260     ‘\nprt@numberlist\nprt@dotlist\nprt@explist\nprt@signlist\nprt@ignorelist’}{%
261     You may only use the specified characters in the argument.}%
262 }%
263 }
```

## F.6 Table alignment

### F.6.1 Aligned numbers, also for ordinary text

Define some lengths that help to calculate the width of a number.

```

264 \newlength{\nprt@digitwidth}%
265 \newlength{\nprt@seewidth}%
266 \newlength{\nprt@decimalwidth}%
267 \newlength{\nprt@blockwidth}%
```

`\nprt@calcblockwidth` Define `\nprt@calcblockwidth{⟨Number type⟩}{⟨Position⟩}{⟨Math mode⟩}`, where `⟨Number type⟩` is either “mantissa” or “exponent”, `⟨Position⟩` is the position relative to the decimal sign (“before” or “after”), `⟨Math mode⟩` is a math mode command (`\displaystyle`, `\textstyle`, `\scriptstyle`, or `\scriptscriptstyle`).

This macro calculates the width of a block if aligned output is requested. The resulted width is stored in the length `\nprt@blockwidth`.

```

268 \newcommand*\nprt@calcblockwidth[3]{%
Store the arguments in macros.
269     \edef\nprt@argone{#1}%
270     \edef\nprt@argtwo{#2}%
271     \edef\nprt@argthree{#3}%
```

Define a macro with the contents “mantissa” to be able to compare it.

```
272 \edef\nprt@mantissaname{mantissa}%
```

Define a macro with the contents “after” to be able to compare it.

```
273 \edef\nprt@aftername{after}%
```

If the width for the mantissa is to be calculated, enter this code part.

```
274 \ifx\nprt@argone\nprt@mantissaname
```

The width of the digits and separators changes between text and math mode. If math mode is active, proceed here.

```
275 \ifmmode
```

Calculate the width of digits. It is assumed that all digits have the same width as a zero. First, execute parameter #3 to switch to the current math style. This is done that way since it is not possible to export length values from `\mathchoice`.

```
276 \settowidth{\nprt@digitwidth}{\mathchoice
```

```
277 0}{0}}%
```

Calculate the width of the separators. This may differ from before and after the decimal sign.

```
278 \settowidth{\nprt@sepwidth}{\mathchoice
```

```
279 \csname nprt@separator@#2\endcsname}}%
```

Calculate the width of the decimal sign.

```
280 \settowidth{\nprt@decimalwidth}{\mathchoice
```

```
281 \nprt@decimal}}%
```

```
282 \else
```

Do the same for text mode.

```
283 \settowidth{\nprt@digitwidth}{0}%
```

```
284 \settowidth{\nprt@sepwidth}{\csname nprt@separator@#2\endcsname}}%
```

```
285 \settowidth{\nprt@decimalwidth}{\nprt@decimal}}%
```

```
286 \fi
```

The same for the exponent.

```
287 \else
```

```
288 \ifmmode
```

```
289 \settowidth{\nprt@digitwidth}{\mathchoice
```

```
290 {}~{0}}}%
```

```
291 \settowidth{\nprt@sepwidth}{\mathchoice
```

```
292 {}~{\csname nprt@separator@#2\endcsname}}}%
```

```
293 \settowidth{\nprt@decimalwidth}{\mathchoice
```

```
294 {}~{\nprt@decimal}}}%
```

```
295 \else
```

```
296 \settowidth{\nprt@digitwidth}{\textsuperscript{0}}%
```

```
297 \settowidth{\nprt@sepwidth}{\textsuperscript
```

```
298 {\csname nprt@separator@#2\endcsname}}}%
```

```
299 \settowidth{\nprt@decimalwidth}{\textsuperscript{\nprt@decimal}}%
```

```
300 \fi
```

```
301 \fi
```

Output to the log file.

```
302 \nprt@debug{Widths for #1 #2 decimal sign
```

```
303 (\ifx\nprt@argthree@empty text mode\else math mode #3\fi):\MessageBreak
```

```
304 digits \the\nprt@digitwidth,
```

```
305 separators \the\nprt@sepwidth,\MessageBreak
```

```
306 decimal sign \the\nprt@decimalwidth}}%
```

Produce a warning if the current number exceeds the reserved space. Signs (+-±) are not taken into account.

```

307 \ifnum\csname nprt@#1@fixeddigits@#2\endcsname<%
308 \csname thenprt@#1@digits#2\endcsname
309 \PackageWarning{numprint}{#1 exceeds reserved space
310 #2\MessageBreak
311 decimal sign}%
312 \fi

```

Calculate the width of the given number of digits without separators.

```

313 \setlength{\nprt@blockwidth}{%
314 \csname nprt@#1@fixeddigits@#2\endcsname\nprt@digitwidth}%

```

Calculate how many separators are put into the number.

```

315 \setcounter{nprt@blockcnt}{\csname nprt@#1@fixeddigits@#2\endcsname}%
316 \addtocounter{nprt@blockcnt}{-1}%
317 \divide\c@nprt@blockcnt 3%

```

If four-digit length numbers are not separated, delete the number of separators again.

```

318 \ifnprt@numsepfour
319 \else
320 \ifnum\csname nprt@#1@fixeddigits@before\endcsname<5
321 \ifnum\csname nprt@#1@fixeddigits@after\endcsname<5
322 \setcounter{nprt@blockcnt}{0}%
323 \fi
324 \fi
325 \fi

```

Add the width of the separators to the width.

```

326 \addtolength{\nprt@blockwidth}{\thenprt@blockcnt\nprt@seewidth}%

```

Add the width of the decimal sign to the width if it is after the decimal sign and there shall be digits after the decimal sign.

```

327 \ifx\nprt@argtwo\nprt@aftername
328 \expandafter\ifnum\csname nprt@#1@fixeddigits@after\endcsname>0
329 \addtolength{\nprt@blockwidth}{\the\nprt@decimalwidth}%
330 \fi
331 \fi
332 }

```

`\npunit` The `\npunit` command takes as argument a unit that is printed in every cell of a table when using the (new) `n` or `N` column types.

```

333 \newcommand*\npunit[1]{\def\nprt@unit{#1}}

```

`\npnunit` Initialize `\nprt@unit`.

```

334 \edef\nprt@unit{\@empty}

```

`\npafternum` The `\npunit` command takes as argument some text that is printed after the number in every cell of a table when using the (new) `n` or `N` column types.

```

335 \newcommand*\npafternum[1]{\def\nprt@afternum{#1}}

```

`\nprt@afternum` Initialize `\nprt@afternum`.

```

336 \edef\nprt@afternum{\@empty}

```

`\npmakebox` The `\npmakebox` is similar to the `\makebox` command but it takes a text as first optional argument instead of a length. The width of the box is calculated by the width of this text.

```
337 \DeclareRobustCommand*\npmakebox{%
338   \@ifnextchar[% ]
339   {\nprt@makebox}{\makebox}%
340 }
```

`\nprt@makebox` The internal part of the `\npmakebox` command.

```
341 \newcommand*\nprt@makebox{}
342 \def\nprt@makebox[#1]{%
343   \settowidth\@tempdima{#1}%
344   \makebox[\@tempdima]%
345 }
```

Declare a bold math alphabet `npbold` that aligns with normal digits.

```
346 \ifnprt@npbold
347   \DeclareMathVersion{npbold}
348   \SetSymbolFont{operators}{npbold}{OT1}{cmr}{b}{n}
349   \SetSymbolFont{letters}{npbold}{OML}{cmm}{b}{it}
350   \SetSymbolFont{symbols}{npbold}{OMS}{cmsy}{b}{n}
351   \SetMathAlphabet\mathsf{npbold}{OT1}{cmss}{b}{n}
352   \SetMathAlphabet\mathit{npbold}{OT1}{cmr}{b}{it}
```

`\npboldmath` Switch to that bold math alphabet.

```
353   \def\npboldmath{\@nomath\npboldmath
354                   \mathversion{npbold}}
355 \fi
```

### F.6.2 Auxilliary routines for the new column types

This code has been developed starting from the `rccol` package by Eckhart Guthöhrlein [3]. Some small bugs of that package have been corrected here, too.

`\nprt@digittoks` Token list that will contain all characters of a tabular cell that are allowed for `\numprint`.

```
356 \newtoks\nprt@digittoks
```

`\nprt@pretoks` Token list with all tokens before the number itself.

```
357 \newtoks\nprt@pretoks
```

`\nprt@posttoks` Token list with all tokens after the number itself.

```
358 \newtoks\nprt@posttoks
```

`\ifnprt@numfound` Has the number already been found in the parsing of the tabular cell?

```
359 \newif\ifnprt@numfound
```

`\nprt@begin` This macro is executed at the begin of each tabular cell.

```
360 \def\nprt@begin{%
```

Initialize the tokens and macros.

```
361 \nprt@digittoks={}%  
362 \nprt@pretoks={}%  
363 \nprt@posttoks={}%  
364 \edef\nprt@unit{\@empty}%  
365 \edef\nprt@afternum{\@empty}%  
366 \nprt@numfoundfalse
```

Set the allowed characters. This macro is made empty when the number itself is read-in totally.

```
367 \edef\nprt@allowedchars{\nprt@numberlist\nprt@dotlist\nprt@explist  
368 \nprt@signlist\nprt@ignorelist}%
```

Start to parse the tabular cell.

```
369 \nprt@getnexttok  
370 }
```

`\nprt@saveothertok` Adds the current token to the list of tokens before or after the number.

```
371 \def\nprt@saveothertok#1{%  
372 \ifnprt@numfound  
  
If the number has already been found it is ended now. This is marked by clearing  
the list of allowed characters.  
  
373 \def\nprt@allowedchars{%  
374 \nprt@posttoks=\expandafter{\the\nprt@posttoks#1}%  
375 \else  
376 \nprt@pretoks=\expandafter{\the\nprt@pretoks#1}%  
377 \fi  
378 }
```

`\nprt@getnexttok` Parse the tabular cell. The argument is the next token of the tabular cell. Inside this command, the end of the tabular cell is detected by different possibilities to end a cell.

```
379 \def\nprt@getnexttok#1{%  
  
If the current token is \tabularnewline or \\ (which is the same) the tabular cell  
is finished.  
  
380 \ifx\tabularnewline#1%  
  
Redefine the \nprt@next command that is called at the end of this command to  
execute the found \tabularnewline command.  
  
381 \let\nprt@next\tabularnewline  
382 \else  
  
If this tabular cell is not in the last column and a & is found, the \nprt@end  
command is found that is inserted into this cell using the < specifier by the column  
types.  
  
383 \ifx\end#1%  
  
Redefine \nprt@next to execute \nprt@end at the end of this command.  
  
384 \let\nprt@next\end  
385 \else  
  
If this is the last cell of the tabular, the \end part of \end{tabular} or  
\end{tabular*} is found.  
  
386 \ifx\nprt@end#1%
```

Test wheather it is the normal or the star version of the environment. Is this really necessary?

```
387     \let\nprt@next\nprt@end
388     \else
```

If this is the last cell of the tabular and the tabular has been called using `\tabular ... \endtabular` instead of using the environment call, `\endtabular` is found.

```
389     \ifx\endtabular#1%
390     \let\nprt@next\endtabular
391     \else
```

For `tabularx`, a test on `\csname` has to be added.

```
392     \ifx\csname#1%
393     \let\nprt@next\csname
394     \else
```

If the last cell of a line is empty, `\relax` will be found.

```
395     \ifx\relax#1%
396     \let\nprt@next\relax
397     \else
```

If no command is found that ends the tabular cell, we are not yet at the end of the cell. Redefine `\nprt@next` to start this command recursively for parsing the next token.

```
398     \let\nprt@next\nprt@getnexttok
```

Test if this token is one of the allowed characters of a number.

```
399     \nprt@ifcharinstring{#1}{\nprt@allowedchars}{%
```

If yes, append this character to the token list of the number and set the flag that the number has been found.

```
400     \nprt@numfoundtrue
401     \nprt@digittoks=\expandafter{\the\nprt@digittoks#1}%
402     }{%
```

If it is no character of a number, store it for the tokens before or after the number.

```
403     \nprt@saveothertok{#1}%
404     }%
405     \fi % \relax
406     \fi % \csname
407     \fi % \endtabular
408     \fi % \nprt@end
409     \fi % \end
410     \fi % \tabularnewline
```

Call the previously saved command (recursion or end of the tabular cell).

```
411     \nprt@next
412 }
```

Boolean to decide if math mode is active outside the tabular cell. This is true for the `array` environment.

```
413 \newif\ifnprt@mathtabular
```

`\nprt@end` This macro is called at the end of each tabular cell. The arguments are used as follows: *<digits before>*, *<digits after>* the decimal sign for the mantissa; *<digits before>*, *<digits after>* the decimal sign for the exponent; commands inserted *<before>* and

(*after*) the `\numprint` command. The arguments five and six are empty for printing the number in text mode and contain “\$” both for printing the number in math mode.

```
414 \def\nprt@end#1#2#3#4#5#6{%
```

First, print the tokens before the number.

```
415 \the\nprt@pretoks
```

Print the number in a group in order to save the tokens before and after the number to be influenced by its settings.

```
416 \begingroup
```

Set the digits for the alignment of the mantissa.

```
417 % \npnodigits
```

```
418 \npdigits{#1}{#2}%
```

Set the digits for the alignment of the exponent if given. If no number of digits is given, they are set negativ.

```
419 \npnoexponentdigits
```

```
420 \ifnum#3<0
```

```
421 \nprt@debug{no exponent alignment in tabular}%
```

```
422 \else
```

```
423 \ifnum#4<0
```

```
424 \nprt@debug{exponent alignment in tabular with #3 digits}%
```

```
425 \npexponentdigits{#3}%
```

```
426 \else
```

```
427 \nprt@debug{exponent alignment in tabular with #3.#4 digits}%
```

```
428 \npexponentdigits[#4]{#3}%
```

```
429 \fi
```

```
430 \fi
```

Omit the section that prints the number if no number has been given.

```
431 \ifnprt@numfound
```

Print the pre-command if defined. Since the pre-command is fixed to nothing or “\$” to switch to math mode, this is only done if the math mode is not active, before. Set the boolean `\ifnprt@mathtabular` according to the previous status in order to close the math mode if necessary.

```
432 \ifmmode
```

```
433 \nprt@mathtabulartrue
```

```
434 \else
```

```
435 \nprt@mathtabularfalse
```

```
436 #5%
```

```
437 \fi
```

Print the number, with unit if one has been given.

```
438 \ifx\nprt@unit\@empty
```

```
439 \numprint{\the\nprt@digittoks}%
```

```
440 \else
```

```
441 \numprint[\nprt@unit]{\the\nprt@digittoks}%
```

```
442 \fi
```

Switch off math mode if it has not been active before.

```
443 \ifnprt@mathtabular
```

```
444 \else
```

```
445 #6%
```

```
446 \fi
```

Print a message to the log file if no number has been specified.

```
447 \else
448 \PackageInfo{numprint}{No number in tabular cell}%
449 \fi
```

Do the rest outside the group in order to prevent the post-texts from being formatted as the number.

```
450 \endgroup
```

Print the tokens after the number.

```
451 \the\nprt@posttoks
```

Print the contents defined with `\npafternum`.

```
452 \ifx\nprt@afternum\@empty
453 \else
454 \npert@afternum
455 \fi
456 }
```

### F.6.3 New column types

Define the new column types.

```
457 \ifnprt@newcolumnntype
```

Declare a new column type `N` which prints a number in text mode and does not need to repeat `\numprint` in each tabular cell. This is declared empty because all executing macros are redefined anyway.

```
458 \newcolumnntype{N}{}
```

`\NC@rewrite@N` Redefine this command to parse the declaration of the `N` column type to look for an optional argument. If none is given, set both optional arguments to “-1”.

```
459 \def\NC@rewrite@N{%
460 \nprt@digittoks}%
461 \nprt@pretoks}%
```

If no optional argument is given, set both optional arguments to “-1”.

```
462 \@ifnextchar[{} ]
463 \nprt@rewrite@{}{}%
464 }{}%
465 \nprt@rewrite@@{}{}{-1}{-1}%
466 }%
467 }
```

Declare a new column type `n` which prints a number and does not need to repeat `\numprint` in each tabular cell. This is declared empty because all executing macros are redefined anyway.

```
468 \newcolumnntype{n}{}
```

`\NC@rewrite@n` Same as `\NC@rewrite@N`, but give “\$” twice for math mode.

```
469 \def\NC@rewrite@n{%
470 \nprt@digittoks}%
471 \nprt@pretoks}%
472 \@ifnextchar[{} ]
473 \nprt@rewrite@{${}$}%
```

```

474   }{%
475   \nprt@rewrite@@{${}$}{-1}[-1]%
476   }%
477   }

```

`\nprt@rewrite@` Look for the second optional argument.

```

478   \def\nprt@rewrite@#1#2[#3]{%
479     \@ifnextchar[{%]
480       \nprt@rewrite@@{#1}{#2}{#3}%
481     }{%
482       \nprt@rewrite@@@{#1}{#2}{#3}[-1]%
483     }%
484   }

```

`\nprt@rewrite@@` The arguments are used as follows: commands inserted *<before>* and *<after>* the `\numprint` command; *<digits before>*, *<digits after>* the decimal sign for the mantissa; *<digits before>*, *<digits after>* the decimal sign for the exponent.

```

485   \def\nprt@rewrite@@#1#2#3[#4]#5#6{%

```

Add the definition for the current column to the already made column definitions that are stored in `\@temptokena`. Before the column itself, the starting command for the parsing, `\nprt@begin`, is inserted. At the end of the column, start the final work, command `\nprt@end`. These commands shall not be expanded, yet.

```

486   \edef\nprt@rewrite@scratch{\the\@temptokena
487     >{\noexpand\nprt@begin\noexpand\noexpand\ignorespaces}1%
488     <{\noexpand\nprt@end{#5}{#6}{#3}{#4}{#1}{#2}}%
489   }%

```

Set `\@temptokena` to the preceding and the current column definition. This is implicitly used by the `array` package.

```

490   \@temptokena\expandafter{\nprt@rewrite@scratch}%

```

Parse for next column in the definition.

```

491   \NC@find
492   }

```

#### F.6.4 Old column types for compatibility

Define the old column types.

```

493 \else

```

The column type `n` aligns the base number but not the exponent.

```

494   \newcolumnntype{n}[2]{>{\npdigits{#1}{#2}$}1<{}}

```

The column type `N` aligns the base number as well as the exponent.

```

495   \newcolumnntype{N}[3]{%
496     >{\npdigits{#1}{#2}\npexponentdigits{#3}$}1<{}}

```

End of column type section.

```

497 \fi

```

## F.7 Round numbers

Stores if the current digit has to be rounded up.

```
498 \newif\ifnprt@roundup
```

Declare the counter used inside `\nprt@round@after` and `\nprt@round@before`.

```
499 \newcount\nprt@thisdigit
```

`\nprt@round@after` Does the rounding of the number after the decimal sign. The first argument contains the current digit, the second the rest of the number.

This routine is a little bit complicated. It is called recursively. In the forward run, it just counts the number of digits, it has parsed already. In the backward run the rounding is done.

```
500 \def\nprt@round@after#1#2\@empty{%
```

Store the arguments in macros.

```
501 \edef\nprt@argone{#1}%
```

```
502 \edef\nprt@argtwo{#2}%
```

Count the parsed digits.

```
503 \advance \nprt@curpos by 1
```

If the end of the number is reached an internal error has been occurred since enough zeros are appended to the number before.

```
504 \ifx\nprt@argone\@empty
```

```
505 \nprt@error{Rounding: End of number has been reached}{This may
```

```
506 not happen}%
```

```
507 \else
```

If the current digit is one behind the last digit to be printed it decides if the last printed digit is rounded or not. This decision is stored in `\ifnprt@roundup`. If this position is reached, stop the recursion.

```
508 \ifnum\nprt@curpos>\nprt@rndpos
```

```
509 \ifnum\nprt@argone>4
```

```
510 \nprt@rounduptrue
```

```
511 \fi
```

```
512 \else
```

The position has not been reached, yet. Thus, call this routine recursively.

```
513 \expandafter\nprt@round@after#2\@empty\@empty
```

The following lines are executed in the backward run when rounding.

Store the current digit in a number in order to be able to calculate with it.

```
514 \nprt@thisdigit=#1
```

If this number is to be rounded up do it by advancing it by one.

```
515 \ifnprt@roundup
```

```
516 \advance \nprt@thisdigit by 1
```

Reset `\ifnprt@roundup` since the preceding digit is not to be rounded, normally.

```
517 \nprt@roundupfalse
```

If the digit has been rounded from 9 to 10, it has to be a “0” and the preceding digit has to be rounded up.

```
518 \ifnum\nprt@thisdigit=10
```

```
519 \nprt@thisdigit=0
```

```
520 \nprt@rounduptrue
```

```

521     \fi
522     \fi
    Store the modified current digit to the new number by putting it into
    \nprt@newnum before all digits that have been stored before.
523     \expandafter\xdef\expandafter\nprt@newnum{%
524     \the\nprt@thisdigit\nprt@newnum}%
525     \fi
526     \fi
527 }

```

`\nprt@round@before` Does the rounding of the number after the decimal sign. The first argument contains the current digit, the second the rest of the number. This routine works as `\nprt@round@after` but stops at its end in contrast to a given number.

```

528 \def\nprt@round@before#1#2\@empty{%
    Store the arguments.
529     \edef\nprt@argone{#1}%
530     \edef\nprt@argtwo{#2}%
    Do the recursion until the end of the number. This routine does not have to decide
    whether the number has to be rounded since it knows that by \ifnprt@roundup,
    set by \nprt@round@after.

```

```

531     \ifx\nprt@argtwo\@empty
532     \else
533     \expandafter\nprt@round@before#2\@empty
534     \fi

```

Store the current digit into a counter and use zero if the number before the decimal sign is empty.

```

535     \ifx\nprt@argone\@empty
536     \nprt@thisdigit=0
537     \else
538     \nprt@thisdigit=#1
539     \fi

```

Add one to the number if it has to be rounded.

```

540     \ifnprt@roundup
541     \advance \nprt@thisdigit by 1

```

Reset the rounding of the next number.

```

542     \nprt@roundupfalse

```

If rounded from 9 to 10, set this digit to “0” and give the information to the next digit.

```

543     \ifnum\nprt@thisdigit=10
544     \nprt@thisdigit=0
545     \nprt@rounduptrue
546     \fi
547     \fi

```

If the number is empty, the new number has to be added and the counter adjusted.

```

548     \ifx\nprt@argone\@empty
549     \xdef\nprt@newnum{\the\nprt@thisdigit}%
550     \stepcounter{nprt@\nprt@numname @digitsbefore}%
551     \else

```

Insert the current digit before the already stored digits in `\nprt@newnum`.

```
552 \expandafter\xdef\expandafter\nprt@newnum{%
553 \the\nprt@thisdigit\nprt@newnum}%
554 \fi
555 }
```

`\nprt@round` Round a number. The first argument is the Number type (“mantissa” resp. “exponent”), the second is the number of digits to be printed after the decimal sign.

```
556 \newcommand*\nprt@round[2]{%
557 \beginingroup
```

Store the Number type for use in `\nprt@round@before` and `\nprt@round@after`.

```
558 \edef\nprt@numname{#1}%
```

If the number of printed digits after the decimal sign is negative, no rounding will be performed.

```
559 \ifnum#2<0
560 \else
```

Print a debug message.

```
561 \nprt@debug{\string\nprt@round: Round after #2 digits for #1}%
```

Set the number of digits after the decimal sign to the given value since this number of digits will be printed later.

```
562 \setcounter{nprt@#1@digitsafter}{#2}%
```

Append enough zeros to the after-decimal-sign part in order to have enough digits that `\nprt@round@after` will not reach the end of the number.

```
563 \expandafter\g@addto@macro\csname nprt@#1@after\endcsname{%
564 \nprt@roundnull}%
```

Two new counters for the round position and the current position in `\nprt@round@after`.

```
565 \newcount\nprt@curpos
566 \newcount\nprt@rndpos
```

Set the number of digits after the decimal sign.

```
567 \nprt@rndpos=#2
```

Default not to round.

```
568 \nprt@roundupfalse
```

Define the “working” number for the subroutines.

```
569 \edef\nprt@tmpnum{\csname nprt@#1@after\endcsname}%
```

The new number starts empty and will be filled by `\nprt@round@after`.

```
570 \edef\nprt@newnum{}%
```

Do the rounding after the decimal sign.

```
571 \expandafter\nprt@round@after\nprt@tmpnum\@empty\@empty
```

Copy the new number after the decimal sign to the “official” command storing it.

```
572 \expandafter\xdef\csname nprt@#1@after\endcsname{\nprt@newnum}%
```

If the integer part has to be modified, too, do it.

```
573 \ifnprt@roundup
```

Copy the number to the working number.

```
574 \edef\nprt@tmpnum{\csname nprt@#1@before\endcsname}%
```

Clear the new number.

```
575 \edef\nprt@newnum{}
```

Do the rounding before the decimal sign.

```
576 \expandafter\nprt@round@before\nprt@tmpnum\@empty\@empty
```

If the first digit has been rounded up from 9 a new digit “1” has to be inserted before the number.

```
577 \ifnprt@roundup
```

```
578 \expandafter\xdef\expandafter\nprt@newnum{1\nprt@newnum}%
```

```
579 \stepcounter{nprt@#1@digitsbefore}%
```

```
580 \fi
```

Copy the new number before the decimal sign to the “official” command storing it.

```
581 \expandafter\xdef\csname nprt@#1@before\endcsname{\nprt@newnum}%
```

```
582 \fi
```

```
583 \fi
```

```
584 \endgroup
```

Set the boolean for a found decimal sign according to the number of printed decimals.

```
585 \ifnum#2<0
```

```
586 \else
```

If rounded to no digits after the decimal sign, switch off printing of it.

```
587 \ifnum#2=0
```

```
588 \csname nprt@#1@decimalfoundfalse\endcsname
```

```
589 \else
```

If one or more digits are printed, a decimal sign has to be printed.

```
590 \csname nprt@#1@decimalfoundtrue\endcsname
```

```
591 \fi
```

```
592 \fi
```

```
593 }%
```

`\nprt@lpad` Pad a number with a character on the left side. The first argument contains the number, the second is the desired length and the third the padding character.

```
594 \newcommand*\nprt@lpad[3]{%
```

If the count of digits is negative, no padding will be performed.

```
595 \ifnum#2<0
```

```
596 \else
```

Print a debug message.

```
597 \nprt@debug{\string\nprt@lpad: Padding #1 with #3 to a length of #2}%
```

If the number has less than the desired length, add the padding character to the left and call this function recursively.

```
598 \ifnum\csname thenprt@#1@digitsbefore\endcsname<#2
```

```
599 \expandafter\xdef\csname nprt@#1@before\endcsname{%
```

```
600 #3\csname nprt@#1@before\endcsname}%
```

```
601 \stepcounter{nprt@#1@digitsbefore}%
```

```
602 \nprt@lpad{#1}{#2}{#3}%
```

```
603 \fi
```

```
604 \fi
```

```
605 }%
```

## F.8 Print the numbers

```

\nprt@sign@+ Define commands for printing the signs in math mode. This ensures that the
\nprt@sign@- printed signs really are signs and not hyphens. Compare “-” to “−”.
\nprt@sign@+- 606 \expandafter\newcommand\csname nprt@sign@+\endcsname{\ensuremath{+}}
607 \expandafter\newcommand\csname nprt@sign@-\endcsname{\ensuremath{-}}
608 \expandafter\newcommand\csname nprt@sign@+\-\endcsname{\ensuremath{\pm}}

\nprt@printsign Print a sign. The first argument contains the number type (“mantissa” or “expo-
nent”). The second argument contains the sign as in source code.
609 \newcommand*\nprt@printsign[2]{%
Write sign to log file.
610 \nprt@debug{\string\nprt@printsign: ‘#2’}%
Set command in a group to prevent the defined macros from being global.
611 \edef\nprt@marg{#2}%
If a plus is to be added do it if no sign given.
612 \csname ifnprt@addplus@#1\endcsname
613 \ifx\nprt@marg\@empty
614 \edef\nprt@marg{+}%
615 \fi
616 \fi
Do nothing if still no sign given.
617 \ifx\nprt@marg\@empty
618 \else
If a macro \nprt@sign@⟨sign⟩ is defined for the given sign, e.g., \nprt@sign@+,
print it; if not, print the sign itself.
619 \@ifundefined{nprt@sign@\nprt@marg}{%
620 \PackageWarning{numprint}{%
621 Unknown sign ‘\nprt@marg’. Print as typed in}%
622 \nprt@marg
623 }{%
624 {\csname nprt@sign@\nprt@marg\endcsname}%
625 }%
626 \fi
627 }

Internal counters for printing.
628 \newcounter{nprt@digitsfirstblock}
629 \newcounter{nprt@blockcnt}
Internal boolean.
630 \newif\ifnprt@shortnumber

\nprt@printbefore Print the number before the decimal sign. The argument is the Number type
(“mantissa” or “exponent”). When this macro is called, everything is parsed already.
Thus, it is known wheather a decimal sign has been found, which and how many
digits are before resp. after the decimal sign etc.
631 \newcommand*\nprt@printbefore[1]{%

```

If missing zeros shall be added and there is no digit before the decimal sign store that “o” into the corresponding command and store in the counter that the number of digits before the decimal sign is one, know.

```

632 \ifnprt@admissingzero
633 \ifnum\csname thenprt@#1@digitsbefore\endcsname=0
634 \expandafter\edef\csname nprt@#1@before\endcsname{0}%
635 \stepcounter{nprt@#1@digitsbefore}%
636 \fi
637 \fi

```

I’m not sure why I have added the group here. But it works and I won’t change it, therefore.

```

638 \beginingroup

```

Store the number to be printed in `\nprt@numbertoprint` in order to have simpler calls in this routine than using `\csname...`

```

639 \edef\nprt@numbertoprint{\csname nprt@#1@before\endcsname}%

```

If four-digit numbers are not to be separated and both, the integer and the real parts, are shorter than 5 digits, set the boolean `\ifnprt@shortnumber` to “true” that the number is printed without separators, later.

```

640 \ifnprt@numsepfour
641 \else
642 \ifnum\csname thenprt@#1@digitsbefore\endcsname<5
643 \ifnum\csname thenprt@#1@digitsafter\endcsname<5
644 \nprt@shortnumbertrue
645 \fi
646 \fi
647 \fi

```

If the number is short according to the preceding code, just print that number by calling `\nprt@numbertoprint`.

```

648 \ifnprt@shortnumber
649 \nprt@numbertoprint
650 \else

```

If the number will get separators, calculate how many separators will be inserted.

```

651 % ganze Bloecke
652 \setcounter{nprt@blockcnt}{%
653 \csname thenprt@#1@digitsbefore\endcsname}%
654 \addtocounter{nprt@blockcnt}{-1}%
655 \divide\c@nprt@blockcnt 3%

```

Then, calculate how many digits are in the first block (one, two, or three). Use `\c@nprt@cntprint` as temporary variable.

```

656 \setcounter{nprt@digitsfirstblock}{%
657 \csname thenprt@#1@digitsbefore\endcsname}%
658 \setcounter{nprt@cntprint}{\thenprt@blockcnt}%
659 \multiply \c@nprt@cntprint 3%
660 \addtocounter{nprt@digitsfirstblock}{-\thenprt@cntprint}%

```

Depending on that number, call `\nprt@printone`, `\nprt@printtwo`, resp. `\nprt@printthree` which do what you may expect with that names.

```

661 \ifnum\thenprt@digitsfirstblock=1
662 \expandafter\nprt@printone\nprt@numbertoprint\@empty
663 \else

```

```

664     \ifnum\thenprt@digitsfirstblock=2
665     \expandafter\nprt@printtwo\nprt@numbertoprint\@empty
666     \else
667     \ifnum\thenprt@digitsfirstblock=3
668     \expandafter\nprt@printthree\nprt@numbertoprint\@empty
669     \else
670     \ifnum\thenprt@digitsfirstblock=0
671     \else
672     \PackageError{numprint}{internal error}{}%
673     \fi
674     \fi
675     \fi
676     \fi
677     \fi
678 \endgroup
679 }

```

`\nprt@printthree` Print three digits. If the command has not reached the end of the string, print a separator `\nprt@separator@before` and call this routine recursively.

```

680 \def\nprt@printthree#1#2#3#4\@empty{%
681   #1#2#3%
682   \def\nprt@tmp{#4}%
683   \ifx\nprt@tmp\empty
684   \else
685     \nprt@separator@before%
686     \nprt@printthree#4\@empty\@empty\@empty
687   \fi
688 }

```

`\nprt@printtwo` The same but start with two instead of three digits.

```

689 \def\nprt@printtwo#1#2#3\@empty{%
690   #1#2%
691   \def\nprt@tmp{#3}%
692   \ifx\nprt@tmp\empty
693   \else
694     \nprt@separator@before%
695     \nprt@printthree#3\@empty\@empty\@empty
696   \fi
697 }

```

`\nprt@printone` The same but start with one instead of three digits.

```

698 \def\nprt@printone#1#2\@empty{%
699   #1%
700   \def\nprt@tmp{#2}%
701   \ifx\nprt@tmp\empty
702   \else
703     \nprt@separator@before%
704     \nprt@printthree#2\@empty\@empty\@empty
705   \fi
706 }

```

`\nprt@printafter` Print the number after the decimal sign. The argument is the Number type (“mantissa” or “exponent”). This macro works similarly as `\nprt@printbefore`.

```

707 \newcommand*\nprt@printafter[1]{%

```

If a missing zero shall be added do it if no digits are given after the decimal sign if a decimal sign has been given. If no decimal sign has been given, the number is pure integer and does not get a real part.

```

708 \csname ifnprt@#1@decimalfound\endcsname
709 \ifnprt@admissingzero
710 \ifnum\csname thenprt@#1@digitsafter\endcsname=0
711 \expandafter\edef\csname nprt@#1@after\endcsname{0}%
712 \stepcounter{nprt@#1@digitsafter}%
713 \fi
714 \fi

```

If a after-decimal zero will be replaced by another command but the real part is empty, put a “o” after the comma (same as “admissingzero”, but here it is just a hack in order to enable the replacement command to take effect later).

```

715 \ifx\nprt@replacenull\@empty
716 \else
717 \ifnum\csname thenprt@#1@digitsafter\endcsname=0
718 \expandafter\edef\csname nprt@#1@after\endcsname{0}%
719 \stepcounter{nprt@#1@digitsafter}%
720 \fi
721 \fi
722 \fi

```

Store the number in `\nprt@numbertoprint` and continue only if it is not empty.

```

723 \begingroup
724 \edef\nprt@numbertoprint{\csname nprt@#1@after\endcsname}%
725 \ifx\nprt@numbertoprint\@empty
726 \else

```

Find out wheather separators have to be inserted.

```

727 \ifnprt@numsefour
728 \else
729 \ifnum\csname thenprt@#1@digitsbefore\endcsname<5
730 \ifnum\csname thenprt@#1@digitsafter\endcsname<5
731 \nprt@shortnumbertrue
732 \fi
733 \fi
734 \fi

```

If a zero has to be replaced by a replacement text, and if the after comma part has the numerical value “o” (= it contains of zeros only), do the replacement.

```

735 \ifx\nprt@replacenull\@empty
736 \else
737 \ifnum\nprt@numbertoprint=0
738 \nprt@shortnumbertrue
739 \edef\nprt@numbertoprint{\nprt@replacenull}%
740 \fi
741 \fi

```

If the number is short (without separators) just print it.

```

742 \ifnprt@shortnumber
743 \nprt@numbertoprint
744 \else

```

Print the number with separators. The choice between different block sizes does not have to be done because the after-decimal-sign part starts with three-digit block from the left end.

```

745     \expandafter\nprt@printthree@after%
746     \nprt@numbertoprint\@empty\@empty\@empty
747     \fi
748     \fi
749 \endgroup
750 }
```

`\nprt@printthree@after` The same as `\nprt@printthree` but with another separator.

```

751 \def\nprt@printthree@after#1#2#3#4\@empty{%
752   #1#2#3%
753   \def\nprt@tmp{#4}%
754   \ifx\nprt@tmp\empty
755   \else
756     \nprt@separator@after
757     \nprt@printthree@after#4\@empty\@empty\@empty
758   \fi
759 }
```

## F.9 The main command

`\numprint` The main macro of the package. The mandatory argument takes a number and prints it as described above. The optional argument may contain a unit which then is printed, too.

```

760 \DeclareRobustCommand*\numprint[2][\@empty]{%
Switch off the error flag. This should not be necessary but is done for stability
reasons.
761   \nprt@argumenterrorfalse
Clear the mantissa and the exponent.
762   \xdef\nprt@exponent{\@empty}%
763   \xdef\nprt@mantissa{\@empty}%
Do everything inside a group to avoid defining too many temporary macros that
are not deleted after the macro.
764   \begingroup
Store the mandatory argument into a macro. Redefine \, and ~ to do nothing as
to ignore them. Because the argument is expanded this does not work with the
ignore list for characters. This again has to be done inside a group to preserve the
two macros for later usage.
765   \begingroup
766   \def\,{}%
767   \catcode'\~= \active % tilde is active
768   \def~{}%
769   \xdef\nprt@marg{#2}%
770   \endgroup
Don't expand the unit because that may cause trouble.
771   \def\nprt@oarg{#1}%
```

Declare some commands to detect empty arguments.

```
772 \def\nprt@empty{\@empty}%
773 \def\nprt@nix{}%
774 \def\nprt@nixleer{ }%
```

Some debug information.

```
775 \ifx\nprt@oarg\nprt@empty
776 \nprt@debug{\string\numprint{\protect#2}}%
777 \else
778 \nprt@debug{\string\numprint[\protect#1]{\protect#2}}%
779 \fi
```

Test for an empty mandatory argument.

```
780 \ifx\nprt@marg\nprt@nix
781 \nprt@error{empty argument}{You have to specify a number in
782 the argument of \string\numprint}%
783 \fi
784 \ifx\nprt@marg\nprt@nixleer
785 \nprt@error{empty argument}{You have to specify a number in
786 the argument of \string\numprint}%
787 \fi
```

Test wheather only valid characters have been used and devide the argument in the mantissa and the exponent.

```
788 \expandafter\nprt@testcharacter\nprt@marg\@empty\@empty
```

If there are invalid characters in the argument, just print the argument without formatting it. Redefine `\pm` to avoid an additional error in text mode.

```
789 \ifnprt@argumenterror
790 \begingroup\def\pm{+}#2\endgroup
791 \else
```

If everything is okay, proceed with parsing.

If the mantissa is empty don't work on it but reset the sign of the mantissa to avoid to reprint the old sign when using `\numprint{e123}`. If it is not empty, parse it for a sign and a number.

```
792 \ifx\nprt@mantissa\@empty
793 \def\nprt@mantissa@sign{\@empty}%
794 \else
795 \nprt@testsign{mantissa}{\nprt@mantissa}%
796 \fi
```

If the mantissa contains only a sign, `\nprt@mantissa` is set to `\@empty` and thus empty even if it wasn't 4 lines above. If the mantissa only contains of a sign and an exponent is given, everything is fine. If no exponent is given, the input format is invalid.

```
797 \ifx\nprt@mantissa\@empty
798 \ifx\nprt@exponent\@empty
799 \nprt@error{Invalid number format. Printing the
800 argument\MessageBreak
801 verbatim}{Something is wrong in the format of the number}%
802 \else
803 \nprt@printsing{mantissa}{\nprt@mantissa@sign}%
804 \fi
805 \else
```

Round the mantissa if necessary.

```
806      \nprt@round{mantissa}{\nprt@rounddigits}%
```

Pad the mantissa if necessary.

```
807      \nprt@lpad{mantissa}{\nprt@lpaddigits}{\nprt@lpadchar}%
808      \fi
```

If an exponent has been found, parse this like the mantissa.

```
809      \ifnprt@expfound
```

Test wheather an exponent character was given but no exponent.

```
810      \ifx\nprt@exponent\@empty
811      \nprt@error{Empty exponent}{If you specify an exponent
812      using one of the characters '\nprt@explist' you
813      have\MessageBreak
814      to give an exponent, too.}%
815      \else
816      \nprt@testsign{exponent}{\nprt@exponent}%
817      \nprt@round{exponent}{\nprt@roundexpdigits}%
818      \fi
819      \fi
```

If either the mantissa or the exponent produces an error, just print the argument as is. Redefine `\pm` to avoid an additional error in text mode.

```
820      \ifnprt@argumenterror
821      \begingroup\def\pm{+-}\endgroup
822      \else
```

Print the mantissa if present.

```
823      \ifx\nprt@mantissa\@empty
824      \else
```

Print the part before the decimal sign.

If the number shall be printed in a box (table alignment) some special things have to be done.

```
825      \ifnprt@mantissa@fixeddigits
826      \ifmmode
```

In math mode, it must be decided which math style is active because the width of the box depends on that. The `\mathchoice` command does the formatting for all styles and typesets the active one then.

```
827      \mathchoice{%
```

Calculate the width of the block for the `\displaystyle`.

```
828      \nprt@calcblockwidth{mantissa}{before}{\displaystyle}%
```

Generate a box with the calculated width and the corresponding math style.

```
829      \makebox[\the\nprt@blockwidth][r]{\displaystyle
```

Print the sign if present.

```
830      \nprt@printsign{mantissa}{\nprt@mantissa@sign}%
```

Print the integer part into the box.

```
831      \nprt@printbefore{mantissa}$}%
832      }{%
```

Do the same for `\textstyle`.

```
833         \nprt@calcblockwidth{mantissa}{before}{\textstyle}%
834         \makebox[\the\nprt@blockwidth][r]{\textstyle
835         \nprt@printsign{mantissa}{\nprt@mantissa@sign}%
836         \nprt@printbefore{mantissa}$}%
837     }{%
```

Do the same for `\scriptstyle`.

```
838         \nprt@calcblockwidth{mantissa}{before}{\scriptstyle}%
839         \makebox[\the\nprt@blockwidth][r]{\scriptstyle
840         \nprt@printsign{mantissa}{\nprt@mantissa@sign}%
841         \nprt@printbefore{mantissa}$}%
842     }{%
```

Do the same for `\scriptscriptstyle`.

```
843         \nprt@calcblockwidth{mantissa}{before}{\scriptscriptstyle}%
844         \makebox[\the\nprt@blockwidth][r]{\scriptscriptstyle
845         \nprt@printsign{mantissa}{\nprt@mantissa@sign}%
846         \nprt@printbefore{mantissa}$}%
847     }%
848     \else
```

If the number is printed in text mode, the size is preserved inside the box. Thus, no hack as for math mode is necessary.

```
849         \nprt@calcblockwidth{mantissa}{before}{\@empty}%
850         \makebox[\the\nprt@blockwidth][r]{%
851         \nprt@printsign{mantissa}{\nprt@mantissa@sign}%
852         \nprt@printbefore{mantissa}%
853     }%
854     \fi
855     \else
```

If the number is printed without fixed width, just print it.

```
856         \nprt@printsign{mantissa}{\nprt@mantissa@sign}%
857         \nprt@printbefore{mantissa}%
858     \fi
```

Print the after-decimal-sign digits. This works exactly as the integer part.

```
859     \ifnprt@mantissa@fixeddigits
860     \ifmmode
861         \mathchoice{%
862         \nprt@calcblockwidth{mantissa}{after}{\displaystyle}%
863         \makebox[\the\nprt@blockwidth][l]{\displaystyle
864         \ifnprt@mantissa@decimalfound
865         \nprt@decimal
866         \fi
867         \nprt@printafter{mantissa}$}%
868     }{%
869     \nprt@calcblockwidth{mantissa}{after}{\textstyle}%
870     \makebox[\the\nprt@blockwidth][l]{\textstyle
871     \ifnprt@mantissa@decimalfound
872     \nprt@decimal
873     \fi
874     \nprt@printafter{mantissa}$}%
875 }{%
876     \nprt@calcblockwidth{mantissa}{after}{\scriptstyle}%

```

```

877         \makebox[\the\nprt@blockwidth][l]{\scriptstyle
878         \ifnprt@mantissa@decimalfound
879         \nprt@decimal
880         \fi
881         \nprt@printafter{mantissa}$}%
882     }{%
883         \nprt@calcblockwidth{mantissa}{after}{\scriptscriptstyle}%
884         \makebox[\the\nprt@blockwidth][l]{\scriptscriptstyle
885         \ifnprt@mantissa@decimalfound
886         \nprt@decimal
887         \fi
888         \nprt@printafter{mantissa}$}%
889     }%
890 \else
891     \nprt@calcblockwidth{mantissa}{after}{\@empty}%
892     \makebox[\the\nprt@blockwidth][l]{%
893         \ifnprt@mantissa@decimalfound
894         \nprt@decimal
895         \fi
896         \nprt@printafter{mantissa}%
897     }%
898     \fi
899 \else
900     \ifnprt@mantissa@decimalfound
901     \nprt@decimal
902     \fi
903     \nprt@printafter{mantissa}%
904 \fi
905 \fi

```

If an exponent is defined it has to be printed later. Therefore, define the command `\nprt@printexp` that just prints its argument.

```

906     \ifnprt@expfound
907     \def\nprt@printexp##1{##1}%

```

If a sign but no number has been given for the exponent `\nprt@exponent` is empty but `\ifnprt@expfound` true. Test for this case here.

```

908     \ifx\nprt@exponent\@empty
909     \nprt@error{Invalid number format in
910     exponent. Printing\MessageBreak
911     garbage}{Something is wrong in the format of the exponent}%
912     \fi
913 \else

```

If there is no exponent but digits reserved for it, define the `\nprt@printexp` so that is just needs that space but does not print anything.

```

914     \ifnprt@exponent@fixeddigits
915     \def\nprt@printexp##1{\hphantom{##1}}%
916 \else

```

If there is no exponent and no reserved digits, don't print the exponent.

```

917     \def\nprt@printexp##1{}%
918     \fi
919 \fi

```

If negative numbers are printed in red (as shown in section 9.2), a positive mantissa with a negative exponent would normally lead to a black mantissa with a red exponent. To avoid that the `\color` command is redefined to do nothing here. Do it in a group to restrain this to the exponent itself.

```
920     \begingroup
921     \def\color##1{%
```

Call the command that either print the exponent, reserves space as it were printed or does nothing.

```
922     \nprt@printexp{%
```

If not mantissa is specified, print the short version, e.g.,  $10^{123}$  and thus leave out the product sign.

```
923         \ifx\nprt@mantissa\@empty
924         \else
```

Print out the product sign, if there is a mantissa.

```
925         \nprt@prod
926         \fi
```

Print “10” and the exponent. This is different between text and math mode.

```
927         \ifmmode 10^\else 10\expandafter\textsuperscript\fi{%
```

Print the number before the decimal sign. As the mantissa.

```
928         \ifnprt@exponent@fixeddigits
929         \ifmmode
930         \mathchoice{%
931             \nprt@calcblockwidth{exponent}{before}{\displaystyle}%
932             \makebox[\the\nprt@blockwidth][r]{${\displaystyle
933                 \nprt@printsign{exponent}{\nprt@exponent@sign}%
934                 \nprt@printbefore{exponent}$}%
935             }{%
936             \nprt@calcblockwidth{exponent}{before}{\textstyle}%
937             \makebox[\the\nprt@blockwidth][r]{${\textstyle
938                 \nprt@printsign{exponent}{\nprt@exponent@sign}%
939                 \nprt@printbefore{exponent}$}%
940             }{%
941             \nprt@calcblockwidth{exponent}{before}{\scriptstyle}%
942             \makebox[\the\nprt@blockwidth][r]{${\scriptstyle
943                 \nprt@printsign{exponent}{\nprt@exponent@sign}%
944                 \nprt@printbefore{exponent}$}%
945             }{%
946             \nprt@calcblockwidth{exponent}{before}{\scriptscriptstyle}%
947             \makebox[\the\nprt@blockwidth][r]{${\scriptscriptstyle
948                 \nprt@printsign{exponent}{\nprt@exponent@sign}%
949                 \nprt@printbefore{exponent}$}%
950             }%
951         \else
952         \nprt@calcblockwidth{exponent}{before}{\@empty}%
953         \makebox[\the\nprt@blockwidth][r]{%
954             \nprt@printsign{exponent}{\nprt@exponent@sign}%
955             \nprt@printbefore{exponent}%
956         }%
957         \fi
958     \else
```

```

959         \nprt@printsign{exponent}{\nprt@exponent@sign}%
960         \nprt@printbefore{exponent}%
961     \fi

    Produce a warning since this is uncommon in exponents.
962     \ifnprt@exponent@decimalfound
963         \PackageWarning{numprint}{Non-integer exponent}%
964     \fi

    Print the part after the decimal sign.
965     \ifnprt@exponent@fixeddigits
966     \ifmmode
967         \mathchoice{%
968             \nprt@calcblockwidth{exponent}{after}{\displaystyle}%
969             \makebox[\the\nprt@blockwidth][l]{\displaystyle
970                 \ifnprt@exponent@decimalfound
971                     \nprt@decimal
972                 \fi
973             \nprt@printafter{exponent}$}%
974         }{%
975             \nprt@calcblockwidth{exponent}{after}{\textstyle}%
976             \makebox[\the\nprt@blockwidth][l]{\textstyle
977                 \ifnprt@exponent@decimalfound
978                     \nprt@decimal
979                 \fi
980             \nprt@printafter{exponent}$}%
981         }{%
982             \nprt@calcblockwidth{exponent}{after}{\scriptstyle}%
983             \makebox[\the\nprt@blockwidth][l]{\scriptstyle
984                 \ifnprt@exponent@decimalfound
985                     \nprt@decimal
986                 \fi
987             \nprt@printafter{exponent}$}%
988         }{%
989             \nprt@calcblockwidth{exponent}{after}{\scriptscriptstyle}%
990             \makebox[\the\nprt@blockwidth][l]{\scriptscriptstyle
991                 \ifnprt@exponent@decimalfound
992                     \nprt@decimal
993                 \fi
994             \nprt@printafter{exponent}$}%
995         }%
996     \else
997         \nprt@calcblockwidth{exponent}{after}{\@empty}%
998         \makebox[\the\nprt@blockwidth][l]{%
999             \ifnprt@exponent@decimalfound
1000                 \nprt@decimal
1001             \fi
1002         \nprt@printafter{exponent}%
1003     }%
1004     \fi
1005     \else
1006         \ifnprt@exponent@decimalfound
1007             \nprt@decimal
1008         \fi
1009         \nprt@printafter{exponent}%

```

```

1010         \fi
1011     }% 10~
1012     }% \nprt@printexp
1013     \endgroup
1014     \fi
1015     \fi

```

If the unit is not empty, print it, too.

```

1016     \ifx\nprt@oarg\nprt@@empty
1017     \else

```

All units expect the degree symbol are separated from the number. Detect wheather the degree symbol is used.

The `\textdegree` command is not useable in math mode. Redeclare it to generate a warning and to use `\tcdegree` instead.

```

1018     \def\textdegree{%
1019         \PackageWarning{numprint}{The unit is typeset in mathmode. Use
1020             \string\tcdegree\space of\MessageBreak
1021             the mathcomp package or \string\degree\space of the
1022             gensymb\MessageBreak
1023             package}%

```

Call `\tcdegree` via `\csname` in order to avoid a second error message if `\tcdegree` is not present (because of not loading `mathcomp.sty`).

```

1024     \csname tcdegree\endcsname
1025     }%

```

Handle `\textcelsius`, `\textohm`, `\textmu`, and `\textperthousand` in the same way as `\textdegree`.

```

1026     \def\nprt@PackageError##1##2{\PackageWarning{numprint}{##1}}%
1027     \def\textcelsius{%
1028         \begingroup
1029         \@ifundefined{tccelsius}{\@ifundefined{celsius}{%
1030             \def\nprt@PackageError####1####2{%
1031                 \PackageError{numprint}{####1}{####2}}%
1032             }{\celsius}}{\tccelsius}%
1033         \nprt@PackageError{The unit is typeset in
1034             mathmode. Use \string\tccelsius\space of\MessageBreak
1035             the mathcomp package or \string\celsius\space of the
1036             gensymb\MessageBreak
1037             package}{If you load the mathcomp package
1038             \string\textcelsius\space is substituted by
1039             \string\tccelsius. If you load the gensymb package
1040             \string\textcelsius\space is substituted by \string\celsius.}%
1041         \endgroup
1042     }%
1043     \def\textohm{%
1044         \begingroup
1045         \@ifundefined{tcohm}{\@ifundefined{ohm}{%
1046             \def\nprt@PackageError####1####2{%
1047                 \PackageError{numprint}{####1}{####2}}%
1048             }{\ohm}}{\tcohm}%
1049         \nprt@PackageError{The unit is typeset in
1050             mathmode. Use \string\tcohm\space of\MessageBreak
1051             the mathcomp package or \string\ohm\space of the

```

```

1052     gensymb\MessageBreak
1053     package}{If you load the mathcomp package
1054     \string\textohm\space is substituted by
1055     \string\textohm. If you load the gensymb package
1056     \string\textohm\space is substituted by \string\ohm.}%
1057   \endgroup
1058 }%
1059 \def\textmu{%
1060   \begingroup
1061   \@ifundefined{tcmu}{%
1062     \def\nprt@PackageError####1####2{%
1063       \PackageError{numprint}{####1}{####2}}%
1064   }{\tcmu}%
1065   \nprt@PackageError{The unit is typeset in
1066     mathmode. Use \string\textmu\space of\MessageBreak
1067     the mathcomp package}{If you load the mathcomp package
1068     \string\textmu\space is substituted by \string\textmu.}%
1069   \endgroup
1070 }%
1071 \def\textperthousand{%
1072   \begingroup
1073   \@ifundefined{tcpertousand}{\@ifundefined{perthousand}{%
1074     \def\nprt@PackageError####1####2{%
1075       \PackageError{numprint}{####1}{####2}}%
1076   }{\perthousand}}{\tcpertousand}%
1077   \nprt@PackageError{The unit is typeset in
1078     mathmode. Use \string\textperthousand\MessageBreak
1079     of the mathcomp package or \string\perthousand\space of
1080     the\MessageBreak
1081     gensymb package}{If you load the mathcomp package
1082     \string\textperthousand\space is substituted by
1083     \string\textperthousand. If you load the gensymb package
1084     \string\textperthousand\space is substituted by
1085     \string\perthousand.}%
1086   \endgroup
1087 }%

```

If the unit is `\tcdegree` from the `mathcomp` package, the unit is a degree sign. Then print the separator `\nprt@degreesep` instead of `\nprt@unitsep`.

```

1088   \def\nprt@tmpunit{\tcdegree}%
1089   \ifx\nprt@oarg\nprt@tmpunit
1090     \ensuremath{\nprt@degreesep}%
1091   \else

```

If the unit is `\degree` from the `gensymb` package, the unit is a degree sign. Then print the separator `\nprt@degreesep` instead of `\nprt@unitsep`.

```

1092   \def\nprt@tmpunit{\degree}%
1093   \ifx\nprt@oarg\nprt@tmpunit
1094     \ensuremath{\nprt@degreesep}%
1095   \else

```

If the unit is `\textdegree` from the `textcomp` package, the unit is a degree sign. Then print the separator `\nprt@degreesep` instead of `\nprt@unitsep`.

```

1096   \def\nprt@tmpunit{\textdegree}%
1097   \ifx\nprt@oarg\nprt@tmpunit

```

```

1098         \ensuremath{\nprt@degreesep}%
1099         \else
    If the unit is \tccelsius from the mathcomp package, the unit is degree centigrade.
    Then print the separator \nprt@celsiussep instead of \nprt@unitsep.
1100         \def\nprt@tmpunit{\tccelsius}%
1101         \ifx\nprt@oarg\nprt@tmpunit
1102         \ensuremath{\nprt@celsiussep}%
1103         \else
    If the unit is \celsius from the gensymb package, the unit is degree centigrade.
    Then print the separator \nprt@celsiussep instead of \nprt@unitsep.
1104         \def\nprt@tmpunit{\celsius}%
1105         \ifx\nprt@oarg\nprt@tmpunit
1106         \ensuremath{\nprt@celsiussep}%
1107         \else
    If the unit is \textcelsius from the textcomp package, the unit is degree centi-
    grade. Then print the separator \nprt@celsiussep instead of \nprt@unitsep.
1108         \def\nprt@tmpunit{\textcelsius}%
1109         \ifx\nprt@oarg\nprt@tmpunit
1110         \ensuremath{\nprt@celsiussep}%
1111         \else
    If the unit is \%, the unit is a percent sign. Then print the separator
    \nprt@percentsep instead of \nprt@unitsep.
1112         \def\nprt@tmpunit{\}%
1113         \ifx\nprt@oarg\nprt@tmpunit
1114         \ensuremath{\nprt@percentsep}%
1115         \else
    If the unit is \tcpertousand from the mathcomp package, the unit is a permil
    sign. Then print the separator \nprt@percentsep instead of \nprt@unitsep.
1116         \def\nprt@tmpunit{\tcpertousand}%
1117         \ifx\nprt@oarg\nprt@tmpunit
1118         \ensuremath{\nprt@percentsep}%
1119         \else
    If the unit is \perthousand from the gensymb package, the unit is a permil sign.
    Then print the separator \nprt@percentsep instead of \nprt@unitsep.
1120         \def\nprt@tmpunit{\perthousand}%
1121         \ifx\nprt@oarg\nprt@tmpunit
1122         \ensuremath{\nprt@percentsep}%
1123         \else
    If the unit is \textperthousand from the textcomp package, the unit is a permil
    sign. Then print the separator \nprt@percentsep instead of \nprt@unitsep.
1124         \def\nprt@tmpunit{\textperthousand}%
1125         \ifx\nprt@oarg\nprt@tmpunit
1126         \ensuremath{\nprt@percentsep}%
1127         \else
    Else, print \nprt@unitsep.
1128         \ensuremath{\nprt@unitsep}%
1129         \fi
1130         \fi
1131         \fi

```

```

1132         \fi
1133     \fi
1134 \fi
1135     \fi
1136 \fi
1137 \fi
1138 \fi
    Finally, print the unit.
1139 \npunitcommand{\nprt@oarg}%
1140 \fi
1141 \endgroup
1142 }

```

## F.10 Print lengths and counters

**\cntprint** The macro for printing counters. The mandatory argument takes a L<sup>A</sup>T<sub>E</sub>X counter. The optional argument may contain a unit which is printed, too.

```

1143 \newcounter{nprt@cntprint}
1144 \DeclareRobustCommand*\cntprint[2][\@empty]{%
1145   \@ifundefined{c@#2}{\nocounterr{#2}}{%
1146     \numprint[#1]{\arabic{#2}}}%
1147   }%
1148 }

```

**\lenprint** The macro for printing lengths. The mandatory argument takes a T<sub>E</sub>X dimension or a counter. The optional argument may contain a unit that is used to convert the unit from pt to the given value and which then is printed, too.

```

1149 \DeclareRobustCommand*\lenprint[2][\@empty]{%
    Do everything in a group to avoid macros to resist outside.
1150 \begingroup
    Save the optional argument in \nprt@oarg and expand it.
1151 \edef\nprt@oarg{#1}%
    If no optional argument has been given, change it to pt. This cannot be done
    as default argument in the \DeclareRobustCommand* definition since printing of
    counters does not have pt as default.
1152 \edef\nprt@tmp{\@empty}%
1153 \ifx\nprt@oarg\nprt@tmp
1154 \def\nprt@oarg{pt}%
1155 \fi

```

If the chosen unit is not defined produce an error message and fall back to pt.

```

1156 \@ifundefined{nprt@factor@\nprt@oarg}{%
1157   \PackageError{numprint}{Invalid unit ‘#1’}{%
1158     The requested unit is not defined using \string\npdefunit.^^J%
1159     Using ‘pt’ instead.}%
1160 \def\nprt@oarg{pt}%
1161 }{}%

```

For later printing, a length is used that is fixed to pt as length. If another unit has been chosen a fake length has to be calculated that is as many pt long as the

original length is in the given unit. Thus, multiply the mandatory argument by the specific factor for the given unit.

```

1162   \setlength{\@tempdima}{#2}%
1163   \setlength{\@tempdima}{\csname nprt@factor@\nprt@oarg\endcsname\@tempdima}%

  If the unit name for the given unit is not defined but the factor is an internal error
  has occurred. Produce an error message.
1164   \@ifundefined{nprt@unit@\nprt@oarg}{%
1165     \PackageError{numprint}{Unknown unit name ‘\nprt@oarg’}{%
1166       Send a bug report to harald.harders@tu-bs.de with a short
1167       example showing this bug.}%
1168   }%

  Store the unit name in \nprt@oarg.
1169   \edef\nprt@oarg{\csname nprt@unit@\nprt@oarg\endcsname}%
1170   }%

  Finally, call \numprint. The two \expandafter are necessary since \numprint
  also uses \nprt@oarg and produces an infinite loop otherwise.
1171   \expandafter\numprint\expandafter[\nprt@oarg]{\strip@pt\@tempdima}%
1172   \endgroup
1173 }

```

**\npdefunit** Define a new unit for usage with `\lenprint`. First argument: name in the source-code. Second argument: printed unit. Third argument: factor from pt to the new unit or \* to preserve old factor.

```

1174 \newcommand*\npdefunit[3]{%
  If the third argument is not * define the factor for this unit in \nprt@factor@⟨#1⟩.
1175   \if#3*
1176   \else
1177     \expandafter\def\csname nprt@factor@#1\endcsname{#3}%
1178   \fi

  Define the unit name for this unit in \nprt@unit@⟨#1⟩.
1179   \expandafter\def\csname nprt@unit@#1\endcsname{#2}%
1180 }

```

Declare the standard units. `\!` is used to delete the unit separator again. This is a hack and does not work in all cases correctly.

```

1181 \npdefunit{pt}{pt}{1.0000000000}
1182 \npdefunit{bp}{bp}{0.99626400996}
1183 \npdefunit{in}{in}{0.01383700013}
1184 \npdefunit{ft}{ft}{0.00115308334}
1185 \npdefunit{mm}{mm}{0.35145980351}
1186 \npdefunit{cm}{cm}{0.03514598035}
1187 \npdefunit{m}{m}{0.0003514598035}
1188 \npdefunit{km}{km}{0.000003514598035}

```

## F.11 Internationalization

**\nprt@ifundefined** The normal `\@ifundefined` command defines the tested macro as side effect. This command is better. Sometimes it will hopefully be unnecessary and supported by the standard (with a different name, of course).

```

1189 \newcommand*\nprt@ifundefined[1]{%
1190   \begingroup\expandafter\expandafter\expandafter\endgroup
1191   \expandafter\ifx\csname #1\endcsname\relax
1192     \expandafter\@firstoftwo
1193   \else
1194     \expandafter\@secondoftwo
1195   \fi
1196 }

```

`\nprt@addto` Adds the code of the second argument to the macro defined in the first argument. This argument has to be specified without the preceding backslash. The code is added only if the command is defined, already.

```

1197 \newcommand\nprt@addto[2]{%
1198   \expandafter\nprt@ifundefined{#1}{}{%
1199     \expandafter\addto\expandafter{\csname #1\endcsname}{#2}%
1200   }%
1201 }

```

`\npaddtolanguage` Define `\npaddtolanguage{<Language>}{<Language definitions>}`. Adds the *<Language definitions>* specified in argument two to the *<Language>* of argument one. The language definitions have to be provided in a command with the name `\npstyle<Language definitions>`. The switching-on command is added to `\extras<Language>` while the switching-off command `\npstyledefault` is added to `\noextras<Language>`.

For example, `\npaddtolanguage{UKenglish}{english}` adds the command `\npstyleenglish` to `\extrasUKenglish` and `\npstyledefault` to `\noextrasUKenglish`.

The `\npstyle<Language definitions>` commands are described below.

```

1202 \newcommand\npaddtolanguage[2]{%
1203   \nprt@addto{extras#1}{\csname npstyle#2\endcsname}%
1204   \nprt@addto{noextras#1}{\npstyledefault}%
1205 }

```

`\npstyledefault` Set the default values for the separators. They are set to the German language because of compatibility with older versions.

```

1206 \newcommand*\npstyledefault{%
1207   \npthousandsep{,}%
1208   \npdecimalsign{,}%
1209   \npproductsign{\cdot}%
1210   \npunitseparator{,}%
1211   \npdegreeseparator{}%
1212   \npcelsiusseparator{\nprt@unitsep}%
1213   \nppercentseparator{\nprt@unitsep}%
1214 }

```

Set the default settings (that are actually the same as German).

```

1215   \npstyledefault

```

`\npstylegerman` Sets the parameters to German habit.

```

1216 \newcommand*\npstylegerman{%
1217   \npthousandsep{,}%
1218   \npdecimalsign{,}%
1219   \npproductsign{\cdot}%
1220   \npunitseparator{,}%
1221   \npdegreeseparator{}%

```

```

1222 \npcelsiusseparator{\nprt@unitsep}%
1223 \nppercentseparator{\nprt@unitsep}%
1224 }

```

`\npstyleenglish` Sets the parameters to English habit.

```

1225 \newcommand*\npstyleenglish{%
1226 \npthousandsep{,}%
1227 \npdecimalsign{.}%
1228 \npproductsign{\times}%
1229 \npunitseparator{\,}%
1230 \npdegreeseperator{ }%
1231 \npcelsiusseparator{\nprt@unitsep}%
1232 \nppercentseparator{\nprt@unitsep}%
1233 }

```

`\npstyleportuguese` Sets the parameters to Portuguese habit.

```

1234 \newcommand*\npstyleportuguese{%
1235 \npthousandsep{.}%
1236 \npdecimalsign{,}%
1237 \npproductsign{\cdot}%
1238 \npunitseparator{\,}%
1239 \npdegreeseperator{ }%
1240 \npcelsiusseparator{\nprt@unitsep}%
1241 \nppercentseparator{\nprt@unitsep}%
1242 }

```

`\npstyledutch` Sets the parameters to Dutch habit.

```

1243 \newcommand*\npstyledutch{%
1244 \npthousandsep{\,}%
1245 \npdecimalsign{,}%
1246 \npproductsign{\cdot}%
1247 \npunitseparator{\,}%
1248 \npdegreeseperator{ }%
1249 \npcelsiusseparator{\nprt@unitsep}%
1250 \nppercentseparator{ }%
1251 }

```

`\npstylefrench` Sets the parameters to French habit.

```

1252 \newcommand*\npstylefrench{%
1253 \npthousandsep{~}%
1254 \npdecimalsign{,}%
1255 \npproductsign{\cdot}%
1256 \npunitseparator{\,}%
1257 \npdegreeseperator{ }%
1258 \npcelsiusseparator{\nprt@unitsep}%
1259 \nppercentseparator{\nprt@unitsep}%
1260 }

```

Do the following actions at `\begin{document}` to ensure that it is done after loading `babel.sty` if it is loaded at all.

```

1261 \AtBeginDocument{%

```

By default, automatic language support is switched off for compatibility reasons. Proceed only if it is switched on.

```

1262 \ifnprt@autolanguage

```

Automatic language support only works with babel.

```
1263 \@ifpackageloaded{babel}{%  
    Adds the language settings to the known languages if they are provided by babel.  
    The current version knows all German, English, Portuguese, Dutch, and French  
    dialects.
```

```
1264 \npaddtolanguage{UKenglish}{english}%  
1265 \npaddtolanguage{USenglish}{english}%  
1266 \npaddtolanguage{afrikaans}{dutch}%  
1267 \npaddtolanguage{american}{english}%  
1268 \npaddtolanguage{austrian}{german}%  
1269 \npaddtolanguage{british}{english}%  
1270 \npaddtolanguage{canadian}{english}%  
1271 \npaddtolanguage{dutch}{dutch}%  
1272 \npaddtolanguage{english}{english}%  
1273 \npaddtolanguage{german}{german}%  
1274 \npaddtolanguage{naustrian}{german}%  
1275 \npaddtolanguage{ngerman}{german}%  
1276 \npaddtolanguage{brazil}{portuguese}%  
1277 \npaddtolanguage{brazilian}{portuguese}%  
1278 \npaddtolanguage{portuges}{portuguese}%  
1279 \npaddtolanguage{portuguese}{portuguese}%  
1280 \npaddtolanguage{français}{french}%  
1281 \npaddtolanguage{canadien}{french}%  
1282 \npaddtolanguage{acadian}{french}%  
1283 \npaddtolanguage{french}{french}%  
1284 \npaddtolanguage{frenchb}{french}%
```

Set the active language again to activate the extras section.

```
1285 \expandafter\selectlanguage\expandafter{\language}%  
1286 }{%
```

If `babel` is not loaded but automatic language support is activated, switch to English as default:

```
1287 \npstyleenglish  
1288 }%  
1289 \fi  
1290 }
```

Load configuration file if present.

```
1291 \InputIfFileExists{numprint.cfg}{%  
1292 \message{Configuration file 'numprint.cfg' loaded.}%  
1293 }{%  
1294 \message{No configuration file 'numprint.cfg' found.}%  
1295 }
```

`\nprt@renameerror` A command for producing an error message for redefined macros.

```
1296 \newcommand*\nprt@renameerror[1]{%  
1297 \expandafter\def\csname #1\endcsname{%  
1298 \PackageError{numprint}{This command has been renamed  
1299 to\MessageBreak  
1300 \string\np #1}{In order to avoid problems with other  
1301 packages and for consistency, this\MessageBreak  
1302 command has been renamed in this version.}%  
1303 }%  
1304 }
```

`\fourdigitsep` Define replacements for the old commands that produce error messages.

`\fourdigitnosep` 1.305 `\nprt@renameerror{fourdigitnosep}`

`\admissingzero` 1.306 `\nprt@renameerror{admissingzero}`

`\noadmissingzero` 1.307 `\nprt@renameerror{noadmissingzero}`

`\digits` 1.308 `\nprt@renameerror{digits}`

`\nodigits` 1.309 `\nprt@renameerror{nodigits}`

`\exponentdigits` 1.310 `\nprt@renameerror{exponentdigits}`

`\noexponentdigits` 1.311 `\nprt@renameerror{noexponentdigits}`

1.312 `\nprt@renameerror{noexponentdigits}`

## Change History

Since the version 1.00 is an entirely new implementation, the Change History prior version 1.00 has been lost in this document. Have a look to `numprint032.dtx` or `README` to get it.

|      |  |        |      |   |    |
|------|--|--------|------|---|----|
| 1.00 | General: Automatic support for different number formats in different languages . . . . . | 8      | 1.12 | General: Adapt Makefile to TeXLive . . . . .  | 1  |
|      | Automatically don't separate degree sign from number . . . . .                           | 4      | 1.13 | General: Small fix in documentation . . . . .   | 1  |
|      | Support for adding a plus to a number . . . . .  | 6      | 1.20 | General: Add padding a number on the left side . . . . .  | 1  |
|      | Total new implementation . . . . .   | 1      |      | Allow <code>\numprint{-e5}</code> in addition to <code>\numprint{e5}</code> . . . . .   | 1  |
|      | <code>\admissingzero</code> : Renamed to <code>\npadmissingzero</code> . . . . .         | 64     |      | Remove the reduction in font sizes in documentation . . . . .   | 1  |
|      | <code>\digits</code> : Renamed to <code>\npdigits</code> . . . . .                       | 64     | 1.21 | General: Add support for Portuguese . . . . .   | 1  |
|      | <code>\exponentdigits</code> : Renamed to <code>\npexponentdigits</code> . . . . .       | 64     | 1.22 | General: Use <code>\npunitcommand</code> to typeset units . . . . .   | 1  |
|      | <code>\fourdigitnosep</code> : Renamed to <code>\npfourdigitnosep</code> . . . . .       | 64     |      | <code>\nprt@printsing</code> : Print sign in a group to avoid additional space for an operator (for <code>nbaseprt</code> ) . . . . .                                     | 45 |
|      | <code>\fourdigitsep</code> : Renamed to <code>\npfourdigitsep</code> . . . . .           | 64     |      | <code>\numprint</code> : Enable to use <code>\textcelsius</code> , <code>\textohm</code> , <code>\textmu</code> , and <code>\textperthousand</code> in the unit . . . . . | 56 |
|      | <code>\noadmissingzero</code> : Renamed to <code>\npnoadmissingzero</code> . . . . .     | 64     |      | Produce a warning rather than an error when using <code>\textdegree</code> as unit . . . . .  | 56 |
|      | <code>\nodigits</code> : Renamed to <code>\npnodigits</code> . . . . .                   | 64     |      | Restrain empty <code>\color</code> command to exponent . . . . .  | 54 |
|      | <code>\noexponentdigits</code> : Renamed to <code>\npnoexponentdigits</code> . . . . .   | 64     | 1.30 | General: Add the commands <code>\lenprint</code> and <code>\cntprint</code> that print lengths and counters. . . . .  | 1  |
|      | <code>\np</code> : Add shortcut for <code>\numprint</code> . . . . .                     | 24     |      |   |    |
| 1.10 | General: Avoid use of <code>substr</code> package . . . . .                              | 22, 27 |      |   |    |
|      | Define math version <code>npbold</code> . . . . .  | 11, 35 |      |   |    |
|      | New tabular alignment mechanism . . . . .  | 9, 39  |      |   |    |
|      | <code>\npmakebox</code> : Declare <code>\npmakebox</code> command . . . . .              | 35     |      |   |    |
| 1.11 | General: Avoid use of <code>\fileversion</code> etc. . . . .                             | 1      |      |   |    |

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| 1.31 | <code>\nprt@getnexttok</code> : Bugfix: The numprint column types did not like empty cells in the last column of a tabular . . . . . 36  | 1.34 | <code>\nprt@calcblockwidth</code> : Fix a bug invoked in version 1.33. Found by Stefan Salewski . . . . . 34                                    |
|      | <code>\numprint</code> : Bugfix: <code>\numprint{e123}</code> reprinted the last used sign . . 50  | 1.35 | General: Support not to separate percent sign from number . . . . 1   |
| 1.32 | General: Improve documentation about <code>textcomp</code> symbols . . . . . 4   | 1.36 | General: Add support for Dutch . . 1<br>Improve documentation . . . . . 1   |
|      | <code>\numprint</code> : Produce an error rather than a warning when using <code>textcomp</code> symbols in the unit if <code>mathcomp</code> or <code>gensymb</code> is not loaded . . . . . 56 | 1.37 | General: Add an own separator for °C . . . . . 1<br>Add support for French . . . . . 1<br>Use separator for percent also for permil . . . . . 1 |
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