The decimalcomma package

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1 Why this package?

In many countries, except notably in the English-speaking countries, the comma is used as the decimal separator for numbers. However, in the math mode of LaTeX, the comma is always, by default, treated as a punctuation symbol and therefore is followed by a space. This is appropriate in intervals: `$[a,b]$` results in $[a, b]$, but is not appropriate for numbers where the comma represents the decimal separator. For example, `$12,5$` is displayed as $12, 5$ instead of 12,5.

Two very convenient packages allow handling the decimal comma. In math mode:

- With icomma (intelligent comma) by Walter Schmidt [1], the comma behaves as a punctuation character if it is followed by a space; otherwise, it is treated as an ordinary character.
- With ncccomma by Alexander I. Rozhenko [2], the comma behaves as an ordinary character if it is followed by a digit (without a space); otherwise, it is considered a punctuation character.

It appears that this second approach is preferable because unlike with icomma, you are not required to add a space after the comma when it's not followed by a digit; however, ncccomma poses several compatibility issues, especially when used with babel in conjunction with numprint [4] and its `autolanguage` option (at least for certain languages such as French and Spanish). Another issue with ncccomma is that compiling with LuaLaTeX or XeLaTeX fails when using unicode-math and `\setmathfont`.

Let it be noted that a code proposed by Claudio Beccari [3], similar to that of ncccomma, presents the same type of issues.

Therefore, we propose a new package, functionally identical to ncccomma but with lighter code, and without the aforementioned incompatibilities.

2 Bugs and problems

When unicode-math is used, it must be loaded *before* decimalcomma[1].

[1] This is also true for icomma.

Here, we are revisiting what Walter Schmidt wrote in the documentation of his icomma package:

In case decimalcomma is used together with the dcolumn package [5], a comma to be printed as the decimal separator in a column of type D is to be specified as {\mathord\mathcomma}, rather than {,}, since the latter leads to an error. For instance:

```
\begin{tabular}{... D{,}{\mathord\mathcomma}{2} ...}
```

Note that specifying the comma as the related input character works as usual. Generally, since the decimalcomma package makes the comma 'active', further problems are not unlikely.

3 Implementation

This first piece of code aims to generate an appropriate error message, if you load unicode-math *after* decimalcomma. To achieve this, first we check if unicode-math has been loaded before. In that case, we do nothing. Else, at the end of the preamble, when all the packages have been loaded, we perform a new verification. If unicode-math has been loaded at that time, the appropriate error message is displayed.

Without this code, the compilation would produce an error message mentioning a problem on \futurelet, incomprehensible for the novice.

```
\@ifpackageloaded{unicode-math}{}{
  \AtBeginDocument{%
    \@ifpackageloaded{unicode-math}{
      \PackageError{decimalcomma}{decimalcomma must be loaded
        after unicode-math}{If you didn't load decimalcomma
        yourself, check which package uses it.}
    }{}
  }
}
```

We have taken up Walter Schmidt's code for looking up the next character, and define the comma as active in math mode, but with an execution loop to test all the digits from 0 to 9 instead of \space. We could have also used ten nested \if ... \else ... \fi structures and that works very well.

We chose to directly load icomma instead of transcribing the beginning portion of its code. This avoids potential conflicts with an extension that also uses icomma[2].

```
\RequirePackage{icomma}
```

First we introduce what icomma does. At \begin{document}, the original \mathcode of the comma is stored, in the \mathcomma macro, and then the comma is defined as active in math mode. The active comma checks the next input character.

[2]The loading of icomma ensures also proper functioning when using babel-french and numprint with its autolanguage option (an issue that does not arise with babel-spanish, for example).

```
\AtBeginDocument{%
  \mathchardef\mathcomma\mathcode`\,%
  \mathcode`\,="8000 %
}
{\catcode`,=\active
  \gdef,{\futurelet\@let@token\sm@rtcomma}
}
```

Then icomma defines the `\sm@rtcomma` macro, but this macro is redefined here to match the expected behavior. If the next character is in the list 0123456789, the active comma returns `\mathord` with the saved `\mathcomma`, so that no space will be added after the comma. Otherwise, `\mathcomma` is returned without `\mathord`, thus the comma behaves by default as a `\mathpunct`. Note that `\@decimal@digit` must be called before `\@let@token` after `\ifx`.

```
\def\sm@rtcomma{%
  \@tfor\decimal@digit:=0123456789%
  \do{\expandafter\ifx\decimal@digit\@let@token\mathord%
    \@break@tfor\fi}%
  \mathcomma}

```

Special thanks to J.F. Burnol for his insightful remarks and valuable advice and let us pay tribute to Walter Schmidt, who is regrettably deceased.

References

[1] *The icomma package for LaTeX 2ε*. Walter Schmidt, CTAN, v2.0 2002/03/10.

[2] *The ncccomma package*. Alexander I. Rozhenko, CTAN, v1.0 2005/02/10.

[3] *Intelligent commas*. Claudio Beccari, The PracTeX Journal, 2011, No.1. https://tug.org/pracjourn/2011-1/beccari/Intcomma.pdf

[4] *The numprint package*. Harald Harders, CTAN, v1.39 2012/08/20.

[5] *The dcolumn package*, David Carlisle. CTAN, v1.06 2023/07/08.