The intervalx package*

Valentin Dao†

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Abstract

The purpose of this package is to extend interval's[1] functionlities by improving the main macro and adding a few new ones. Although the implementation is has been modernised through the use of expl3, the approach is very similar to that used by Lars Madsen. As such, most keys will have the same name. Even though intervalx is presented as an extension of interval, new macros for composing inequalities have nevertheless been implemented.

Contents

*This file describes v1.0.0

†E-mail: vdao.texdev@gmail.com

[1]See on CTAN.

License

Fonts

Mercury Text G4 Roman
© 1996, 2007 Hoefler & Co.

Whitney-Medium
© 1996, 2009 Hoefler & Frere-Jones.

Repository

See GitHub repository.

1 Package options

Here are the options that can be declared using `\usepackage`:

`soft fences` ⟨*booléen*⟩ `(défaut: false)`

This key replaces open brackets with parentheses.

`smart fences` ⟨*booléen*⟩ `(défaut: true)`

This key automatically adapts the direction of the brackets to the presence of $+\infty$ and $-\infty$

`separator` ⟨*token*⟩ `(défaut: ,)`

Controls the character inserted between the interval bounds.

2 Typeset an interval

`\interval` `*[⟨keyval⟩]{⟨list of limits⟩}`

To typeset an interval, simply use the macro in math mode, entering the limits in the form of a list:

LaTeXcode

```
\begin{equation}
  \interval{a, b}
\end{equation}
```

Result

$$[a, b] \tag{1}$$

`open`
`open right`
`open left`

To change the brackets' direction, you can use the option provided here.

LaTeXcode

```
\begin{gather}
  \interval[open right]{a, b}\\
  \interval[open left]{a, b}\\
  \interval[open]{a, b}
\end{gather}
```

Result

$$[a, b[\tag{2}$$
$$]a, b] \tag{3}$$
$$]a, b[\tag{4}$$

The direction of the brackets also adapts itslef to `-\infty` and `+\infty`, provided that the corresponding option remains enabled.

LaTeXcode

```
\begin{equation}
  \interval{-\infty, +\infty}
\end{equation}
```

Result

$$]-\infty, +\infty[\tag{5}$$

`scaled` `big, Big, bigg, Bigg, auto` `(défaut: auto)`

It is also possible to adjust the brackets/parentheses' size through the `scaled` key, which has the same usage as in the interval package. Il est également possible d'ajuster la taille des crochets/parenthèses à travers la clé `scaled`, qui a le même comportement que dans le package interval.

LaTeXcode

```
\begin{equation}
  \interval[scaled]{\frac{1}{2}, \frac{3}{2}}
\end{equation}
```

Result

$$\left[\frac{1}{2}, \frac{3}{2}\right] \tag{6}$$

Finally, the starred variant typesets integer intervals by using the stmaryrd package.[2] All the keys described above are compatible with these symbols.

LaTeXcode

```
\begin{equation}
  \interval*{2, 10}
\end{equation}
```

Result

$$[\![2, 10]\!] \tag{7}$$

3 Product, reunioin

4 Interval product, union, and intersection

intervalx also makes it easier to typeset product, union, and intersection relations between intervals.

4.1 Product

`\xinterval` `[`⟨*keys*⟩`]{`⟨**-list*⟩`}`

For the product, the main argument takes the same form as with `\interval`, but the different intervals are delimited by an asterisk.

> ***Mnemonic:*** The "x" at the beginning of the macro name evokes the product symbol $\times$, while the asterisk is a way of denoting it in programming.

LaTeXcode

Result

[2] See on CTAN

```
\begin{equation}
  \xinterval{2, 10 * 1, 15 * -3,
    19}
\end{equation}
```

$$[2, 10] \times [1, 15] \times [-3, 19] \tag{8}$$

To combine this macro with the keys of `\interval`, the latter must be specified as a list delimited by semicolons (the comma being already used to separate the different keys). Here is an example to clarify this point.

LaTeXcode

```
\begin{equation}
  \xinterval[open right, scaled;
    open left, scaled]{2, 10 * 1,
    15}
\end{equation}
```

Result

$$[2, 10[\times]1, 15] \tag{9}$$

4.2 Union

`\uinterval` `[`⟨*keys*⟩`]{`⟨*|-list*⟩`}`

Similarly, interval union is typeset using the vertical bar as a delimiter.

> ***Mnemonic:*** The "u" at the beginning of the macro name evokes the union symbol ∪, while the vertical bar is a way in programming to denote the logical *or*.

LaTeXcode

```
\begin{equation}
  \uinterval{2, 10 | 1, 15}
\end{equation}
```

Result

$$[2, 10] \cup [1, 15] \tag{10}$$

4.3 Intersection

`\ninterval` `[`⟨*keys*⟩`]{`⟨*&-list*⟩`}`

Again, interval intersections are typeset using the ampersand as a delimiter. The use of keys is also identical to `\xinterval` and `\uinterval`.

Mnemonic: The “n” evokes the intersection symbol ∩, with the ampersand denoting the logical *and* in programming.

LaTeXcode

```
\begin{equation}
  \ninterval{3, 20 & \pi, e^3}
\end{equation}
```

Result

$$[3, 20] \cap [\pi, e^3] \tag{11}$$

5 Inequalities

\ineq *[⟨*keys*⟩]{⟨*list of limits*⟩}[⟨*variable*⟩]

The composition of inequalities is quite similar to that of intervals, with a few differences. The keys `open right`, `open left` and `open` are also available to make it easy to write strict or non-strict inequalities. In addition to the bounds, it is also possible to specify the variable, which defaults to x. Finally, the starred variant of the macro uses the alternative symbols from amssymb for non-strict inequalities.

LaTeXcode

```
\begin{gather}
  \ineq{a, b}\\
  \ineq*{a, b}[y]\\
  \ineq[open right]{a, b}\\
  \ineq[open left]{a, b}\\
  \ineq[open]{a, b}
\end{gather}
```

Result

$$a \leq x \leq b \tag{12}$$
$$a \leqslant y \leqslant b \tag{13}$$
$$a \leq x < b \tag{14}$$
$$a < x \leq b \tag{15}$$
$$a < x < b \tag{16}$$

Changelog

1.0.0 (2025-07-26) —

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