The \texttt{nl-interval} package

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Abstract

This is a \LaTeX\ package that aims to simplify and agilize the process of representing intervals in the real axis. Four commands are provided: \texttt{\textbackslash nlAxisX}, \texttt{\textbackslash nluminf}, \texttt{\textbackslash linfnum} and \texttt{\textbackslash numnum}, they were built around the packages \texttt{tkz-fct}, \texttt{ifthen} and \texttt{xparse} and require being used inside a \texttt{tikzpicture} environment.

1 How to use

1.1 How to load the package

The package is loaded as usual, through the command

\begin{verbatim}
\usepackage{nl-interval}
\end{verbatim}

There are, at this time, no options available to include here.

1.2 The commands

The first command is \texttt{\textbackslash nlAxisX} and it simply draws the $x$ axis where the intervals are going to be represented. It has two mandatory inputs: the minimum and maximum of the axis, so, the full instruction is: \texttt{\textbackslash nlAxisX\{min\}\{max\}}:

\begin{verbatim}
\begin{tikzpicture}
  \nlAxisX{-2}{5}
\end{tikzpicture}
\end{verbatim}

would give the output:

\begin{center}
\begin{tikzpicture}

\nlAxisX{-2}{5}

\end{tikzpicture}
\end{center}

After the axis is drawn, one can start placing the intervals. To do this we will consider two kinds of intervals, the ones with infinity, either $-\infty$ or $+\infty$ and the ones with two numbers.
Let's start with the first group.

- \texttt{\linfnum} will draw intervals of the kind: \([-\infty, \text{number}] \) or \([-\infty, \text{number}]\).
- \texttt{\lnuminf} will draw intervals of the kind: \([\text{number}, +\infty[ \) or \([\text{number}, +\infty[\).

These two commands also have two mandatory inputs: first one is the number \textit{(always a decimal representation, so, something like \(\pi\) doesn't work but there is a workaround!)} and the second if it's an open or closed interval at the number. So, for instance

\begin{tikzpicture}
\nlAxisX{-2}{5}
\lnuminf{3}{o}
\linfnum{1}{c}
\end{tikzpicture}

gives us

\begin{center}
\includegraphics{example}
\end{center}

This time, there are a few optional inputs, the full commands are like this:

\begin{verbatim}
\lnuminf[1]{number}[2]{o or c}[3]
\linfnum[1]{number}[2]{o or c}[3]
\end{verbatim}

- in [1] you can put options like different colours or patterns used;
- in [2] you can substitute the number for a letter or an exact representation of the number, don't put it in math environment!
- in [3] you can change the height of the interval, which is 0.5cm by default.

Let's try some of these options:

\begin{verbatim}
\begin{tikzpicture}
\nlAxisX{-2}{5}
\lnuminf[pattern=north west lines]{1.4142}[^2]{c}[.7]
\linfnum[red!20]{3.1416}[^\pi]{o}
\end{tikzpicture}
\end{verbatim}

\begin{center}
\includegraphics{example2}
\end{center}
The second group of intervals, works with a single command:

- \texttt{\textbackslash nlnumnum}

and, since it uses two numbers, we have four mandatory inputs: the numbers and the instruction of closed or open. It works like this:

\begin{tikzpicture}
\nlAxisX{-2}{5}
\nlnumnum{-1}{o}{3}{c}
\end{tikzpicture}

As with the previous commands, there are a few options, this time we have one more which allows us to change what is shown in the second number:

\begin{tikzpicture}
\nlAxisX{-2}{5}
\nlnumnum[red!20]{-1.4142}{\sqrt{2}}{3.1416}{\pi}{c}
\lnuminf[pattern=north west lines]{1.4142}{\sqrt{2}}{c}[.7]
\linfnum{2}{o}[.3]
\end{tikzpicture}

2 Conclusion

This is a really simple package (my first attempt at a package) but one that, I hope, can help you draw stuff like:

\begin{tikzpicture}
\nlAxisX{-2}{5}
\nlnumnum[red!20]{-1.4142}{\sqrt{2}}{3.1416}{\pi}{c}
\lnuminf[pattern=north west lines]{1.4142}{\sqrt{2}}{c}[.7]
\linfnum{2}{o}[.3]
\end{tikzpicture}

somewhat quickly and easily. By the way, the instructions for this are:

\begin{tikzpicture}
\nlAxisX{-2}{5}
\nlnumnum[red!20]{-1.4142}{\sqrt{2}}{3.1416}{\pi}{c}
\lnuminf[pattern=north west lines]{1.4142}{\sqrt{2}}{c}[.7]
\linfnum{2}{o}[.3]
\end{tikzpicture}