ConTEXt

title   : **Math Sets**

subtitle : **ConTEXt port of** `braket.sty`

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1 Introduction

I write a lot of probability expressions, which look like

$$\mathrm{E}\left\{\sum_{y} f(X,y)\,\middle|\,Z\right\}$$

The delimiters should scale properly, and so should the *conditional* sign |. Moreover the spacing around the conditional sign should be correct. This ensures that the resultant TEX code is almost unreadable. In LATEX I used to use Donald Arseneau's `braket.sty` to typeset should expressions. CONTEXT does not have anything similar. So, this is a port of `braket.sty` functionality to CONTEXT. I have not ported everything, only the features that I use.

2 Usage

To use this module add

```
\usemodule[mathsets]
```

on the top of your file. Now, a new *set* can be defined as follows: After which you can use

```
\startformula
    \EXP{f(X) | Y} = \sum_{x} f(x) \PR{x|Y}
\stopformula
```

$$\mathrm{E}\left\{f(X)\,\middle|\,Y\right\} = \sum_{x} f(x) \Pr\left(x\,\middle|\,Y\right)$$

We can also run the example specified in `braket.sty` documentation.

```
\definemathset[BRAKET][left=\langle,right=\rangle]
\definemathset[SET]

\startformula
  \BRAKET{ \phi | \frac{\partial^2}{\partial t^2} | \psi }
  \SET{ x\in {\bf R}^2 | 0<{|x|}<5 }
\stopformula
```

$$\left\langle\phi\,\middle|\,\frac{\partial^2}{\partial t^2}\,\middle|\,\psi\right\rangle\left\{x \in \mathbf{R}^2\,\middle|\,0 < |x| < 5\right\}$$

Notice that the | protected by {|} did not get expanded in the second expression.

3 Implementation

1   `\unprotect`

Since two letter codes are reserved for system modules, and CONTEXT seems to be running out of those, I choose a more verbose variable to store options.

2   `\definesystemvariable {mathset}   % Math Set`

`\setupmath..`   To specify the default values of left, middle, and right delimiters

3 `\def\setupmathset`
   `{\dosingleargument\getparameters[\??mathset]}`

4 `\def\definemathset`
   `{\dodoubleargument\dodefinemathset}`

`\definemat..` To define new math delimiters

5 `\let\currentmathset\empty`
   `\let\currentmathsetgrouplevel\empty`

6 `\def\mathsetmiddle`
   `{\ifnum\currentmathsetgrouplevel=\currentgrouplevel`
   `\expandafter\firstoftwoarguments`
   `\else`
   `\expandafter\secondoftwoarguments`
   `\fi`
   `{\egroup\,\middle\mathsetparameter\c!middle\,\bgroup}`
   `{\mathsetparameter\c!middle}}`

7 `\def\mathsetparameter#1%`
   `{\executeifdefined{\??mathset\currentmathset#1}{\executeifdefined{\??mathset#1}\empty}}`

8 `\def\dodefinemathset[#1][#2]%`
   `{\getparameters[\??mathset#1][#2]`
   `\setvalue{#1}{\dododefinemathset[#1]}}`

Since | is already active, we do not have to make it active again.

9 `\def\dododefinemathset[#1]#2#%`
   `{\begingroup`
   `\def\currentmathset{#1}`
   `\edef\currentmathsetgrouplevel{\the\numexpr\currentgrouplevel+2\relax}`
   `\mathcode`\|32768`
   `\let|\mathsetmiddle`
   `\def\mathsetarguments{#2}`
   `\dodododefinemathset}`

The extra group in the definition of `dodododefinemathset` is so that such expressions turn out correct

$$\mathrm{E}\left\{\left(\frac{a}{b}\right)\middle|\left(\frac{a}{\frac{b}{\sum c}}\right)\right\}$$

10 `\def\dodododefinemathset#1%`
   `{\doifsomething{\mathsetparameter\c!text}`
   `{\mathop{\mathsetparameter\c!text\mathsetarguments}}`
   `\left\mathsetparameter\c!left{#1}\right\mathsetparameter\c!right`
   `\endgroup}`

11 `\setupmathset`
   `[  left={\{},`
   `   right={\}},`
   `  middle=\vert]`

12   \protect