The altsubsup package*

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Abstract

A LaTeX package to write alternative and customisable subscripts and superscripts, with square brackets.

Typical use:

`x_[roman]^{italic}` ⟶ $x^{italic}_{\text{roman}}$

`x_{italic}^[roman]` ⟶ $x^{\text{roman}}_{italic}$

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*This document corresponds to altsubsup v1.1, dated 2022/03/15.

1 Introduction

The altsubsup package allows to write alternate subscripts and superscripts, in math mode, with square brackets :

`x_[my subscript]` or `x^[my superscript]`.

These alternate superscripts and superscripts are formatted by the commands set, respectively, with `\SetAltSubscriptCommand` and `\SetAltSuperscriptCommand`. By default, the `\text` command, from amstext (part of amsmath) is used. This gives:

$x_{\text{my subscript}}$ or $x^{\text{my superscript}}$.

This package redefine `_` and `^` symbols. Options allow to redefine both (by default), only subscript `_` symbol, or only superscript `^` symbol.

2 Motivations

Common typographic conventions[1] use italic (sloping) type for physical quantities or mathematical variables and roman (upright) type for words or fixed numbers. For example, heat capacity at constant pressure should be printed C_P, but kinetic energy E_k (instead of E_k) and relative permeability μ_r (instead of μ_r). This can be obtainted in LaTeX with[2] `E_{\mathrm{k}}` and `\mu_{\mathrm{r}}`. This package allows to write them simply `E_[k]` and `\mu_[r]`.

3 User interface

3.1 Usage

`\SetAltSubscriptCommand{`⟨*cmd*⟩`}`

Set the command ⟨*cmd*⟩ used to format square brackets subscripts `_[...]`. By default, ⟨*cmd*⟩ is the `\text` command, provided by the amstext package (part of amsmath package).

`\SetAltSuperscriptCommand{`⟨*cmd*⟩`}`

Set the command ⟨*cmd*⟩ used to format square brackets superscripts `^[...]`. By default, ⟨*cmd*⟩ is the `\text` command, provided by the amstext package (part of amsmath package).

`\SetAltSubSupCommands{`⟨*cmd*⟩`}`

Set both square brackets subscripts and square brackets superscripts, with the same command ⟨*cmd*⟩.

[2]See, for example: International Organization for Standardization. (2009). *Quantities and units – Part 1: General* (ISO Standard No. 80000-1:2009). https://www.iso.org/standard/30669.html.

[2]Instead of `\mathrm`, a best choice is the `\text` macro provided by amsmath package, which, for example, handle spaces. It's the formatting macro used by default by the altsubsup package.

3.2 Options

To load the package, add in your preamble:

```
\usepackage[⟨option⟩]{altsubsup}
```

Available values for ⟨*option*⟩:

`subscript` redefine only the `_` subscript symbol.

`superscript` redefine only the `^` superscript symbol.

`both` redefine both `_` and `^` symbols (default).

`spbmark` use the spbmark package to handle bracket form of superscripts and superscripts (see below).

`spbmark` option

The spbmark package (https://www.ctan.org/pkg/spbmark), by Qu Yi, allows a complete customisation of subscripts and superscripts. With the `spbmark` option, the altsubsup package use the `\sub` and `\super` macros of the spbmark package to handle subscripts and superscripts in place of the standard `_` and `^` commands.

Theses two macros are called with the respective `altsub` and `altsup` styles, allowing simple customization (these styles are initially created empty). For example, to display subscripts in blue and superscripts in red, use:

```
\defspbstyle{altsub}{cmd=\color{blue}}
\defspbstyle{altsup}{cmd=\color{red}}
```

A major limitation is that using simultaneously a subscript and a superscript gives bad formatting (the spbmark macro for this is `\supersub`). For example, `x_[sub]^[super]` gives $x_{\text{sub}}{}^{\text{super}}$ instead of $x_{\text{sub}}^{\text{super}}$.

4 Example

The following input:

```
Default:
\begin{displaymath}
  x_a^b  \quad
  x_{braces sub}^{braces sup}  \quad
  x_[brackets sub]^{braces sup}  \quad
  x_{braces sub}^[brackets sup]  \quad
  x_[brackets sub]^[brackets sup]
\end{displaymath}

New formats:
% \text from amstext package
% \color from xcolor package
\newcommand{\bluecolor}[1]{\text{\color{blue}#1}}
\newcommand{\redcolor}[1] {\text{\color{red}#1}}
\SetAltSubscriptCommand{\bluecolor}
\SetAltSuperscriptCommand{\redcolor}
\begin{displaymath}
  x_a^b  \quad
  x_{braces sub}^{braces sup}  \quad
  x_[brackets sub]^{braces sup}  \quad
  x_{braces sub}^[brackets sup]  \quad
  x_[brackets sub]^[brackets sup]
\end{displaymath}

Same command for subscripts and superscripts:
\SetAltSubSupCommands{\mathbf}
\begin{displaymath}
  x_a^b  \quad
  x_{braces sub}^{braces sup}  \quad
  x_[brackets sub]^{braces sup}  \quad
  x_{braces sub}^[brackets sup]  \quad
  x_[brackets sub]^[brackets sup]
\end{displaymath}
```

gives:

Default:

$$x_a^b \quad x_{bracessub}^{bracessup} \quad x_{\text{brackets sub}}^{bracessup} \quad x_{bracessub}^{\text{brackets sup}} \quad x_{\text{brackets sub}}^{\text{brackets sup}}$$

New formats:

$$x_a^b \quad x_{bracessub}^{bracessup} \quad x_{\text{brackets sub}}^{bracessup} \quad x_{bracessub}^{\text{brackets sup}} \quad x_{\text{brackets sub}}^{\text{brackets sup}}$$

Same command for subscripts and superscripts:

$$x_a^b \quad x_{bracessub}^{bracessup} \quad x_{\mathbf{bracketssub}}^{bracessup} \quad x_{bracessub}^{\mathbf{bracketssup}} \quad x_{\mathbf{bracketssub}}^{\mathbf{bracketssup}}$$

5 Complements

5.1 Known issue

The use of the prime symbol `'` can raise the *Double superscript* error message. This is normally fixed (`x'^2` gives x'^2 correctly). If needed, enclose the expression with `{...}`. In particular, `x'^[sup]` doesn't work, and should be written: `{x'}^[sup]`.

5.2 Alternative

the subtext package (https://www.ctan.org/pkg/subtext), by Palle Jørgensen, formats `_[...]` subscripts with `\text` (the differences, is that the altsubsup package works both for subscripts and superscripts, allows to customise the commands, and redefine symbols only in math mode).

5.3 Changelog

v1.1
- Backup standard subscript `_` and superscript `^` commands to handle packages that redefine `\sb` or `\sp` macros, as spbmark.
- Add option `spbmark` to format subscripts and superscripts with the spbmark package.

v1.0 Initial version.

6 Implementation

Package declaration

```
\ProvidesPackage{altsubsup}[2022/03/15, v1.1, Alternative and customisable
subscripts and superscripts, with  square brackets.]
```

Flags declaration

Determine the commands that will be redefined

```
\newif\ifaltsbsp@subscript    \altsbsp@subscripttrue
\newif\ifaltsbsp@superscript  \altsbsp@superscripttrue
```

Use the spbmark mechanism

```
\newif\ifaltsbsp@spbmark      \altsbsp@spbmarkfalse
```

Options declarations and processing

```
\DeclareOption{subscript}   {\altsbsp@subscripttrue   \altsbsp@superscriptfalse}
\DeclareOption{superscript} {\altsbsp@subscriptfalse  \altsbsp@superscripttrue }
\DeclareOption{both}        {\altsbsp@subscripttrue   \altsbsp@superscripttrue }
\DeclareOption{spbmark}     {\altsbsp@spbmarktrue}
\DeclareOption*{\PackageWarning{altsubsup}{Unknown option \CurrentOption.}}
\ProcessOptions\relax
\ifaltsbsp@spbmark
  \RequirePackage{spbmark}
\fi
```

Backup standard superscript and subscript commands

```
\AtBeginDocument{%
  \begingroup\catcode`\_=8 \global\let\altsbsp@standardsub=_\endgroup
  \begingroup\catcode`\^=7 \global\let\altsbsp@standardsup=^\endgroup
```

Redefine catcodes and make symbols active in mathmode

```
  \ifaltsbsp@subscript    \catcode`\_=12 \mathcode`\_="8000 \fi%
  \ifaltsbsp@superscript  \catcode`\^=12 \mathcode`\^="8000 \fi%
}
```

Redefinition of the subscript symbol

```
\ifaltsbsp@subscript%
\begingroup\lccode`\~=`\_\lowercase{\endgroup%
  \def~}{\@ifnextchar[% dummy bracket ]
  {\altsbsp@subwrapper}% bracket wrapper
  {\altsbsp@standardsub}% standard form
}%
\fi
```

Redefinition of the superscript symbol

```
\ifaltsbsp@superscript%
\begingroup\lccode`\~=`\^\lowercase{\endgroup%
  \def~}{\@ifnextchar[% dummy bracket ]
  {\altsbsp@supwrapper}% bracket wrapper
  {\altsbsp@standardsup}% standard form
}%
\fi
```

User macros

`\SetAltSubscriptCommand`

```
\def\SetAltSubscriptCommand#1{\let\altsbsp@altsubcmd#1}%

\ifaltsbsp@spbmark%
  \defspbstyle{altsub}{}
  \def\altsbsp@subwrapper[#1]{\sub[style=altsub]{\altsbsp@altsubcmd{#1}}}%
\else
  \def\altsbsp@subwrapper[#1]{\altsbsp@standardsub{\altsbsp@altsubcmd{#1}}}%
\fi
```

`\SetAltSuperscriptCommand`

```
\def\SetAltSuperscriptCommand#1{\let\altsbsp@altsupcmd#1}%

\ifaltsbsp@spbmark%
  \defspbstyle{altsup}{}
  \def\altsbsp@supwrapper[#1]{\super[style=altsup]{\altsbsp@altsupcmd{#1}}}%
\else
  \def\altsbsp@supwrapper[#1]{\altsbsp@standardsup{\altsbsp@altsupcmd{#1}}}%
\fi
```

`\SetAltSubSupCommands`

```
\newcommand{\SetAltSubSupCommands}[1]{%
  \SetAltSubscriptCommand{#1}%
  \SetAltSuperscriptCommand{#1}%
}
```

Set default commands

```
\RequirePackage{amstext}%
\SetAltSubSupCommands{\text}%
```

Fix prime symbol

```
\ifaltsbsp@superscript%
\begingroup \catcode`\^=12%
\gdef\altsbsp@pr@m@s{% copy of \@pr@m@s code from latex.ltx
  \ifx'\@let@token
    \expandafter\pr@@@s
  \else
    \ifx^\@let@token
      \expandafter\expandafter\expandafter\pr@@@t
    \else
      \egroup
    \fi
  \fi}
\endgroup
\let\pr@m@s\altsbsp@pr@m@s
\fi
```

End of the package

```
\endinput
```

Change History

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Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.