The `hhtensor` package*

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Abstract

This package provides commands for vectors, matrices, and tensors with different styles (arrows as the LaTeX default, underlined, and bold).

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1 Load the package

To use this package place

`\usepackage[`⟨*style*⟩`]{`⟨*hhtensor*⟩`}`

in the preamble of your document. The ⟨*style*⟩ is `arrow`, `bold`, or `uline` for arrow style, bold symbols, resp. underlined symbols. Default is `arrow`.

2 Usage

`\vec` Vectors are printed as usual using the `\vec{`⟨*symbol*⟩`}` command. Depending on the style, they are printed $\vec{\alpha}$, $\boldsymbol{\alpha}$, resp. $\underline{\alpha}$.

`\matr` Matrices are printed using `\matr{`⟨*symbol*⟩`}`: $\vec{\vec{\alpha}}$, $\boldsymbol{\alpha}$, resp. $\underline{\underline{\alpha}}$.

`\tens` Tensors are a little bit different. They take two arguments while the first one

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is the symbol, while the second is the step: `\tens{`⟨*symbol*⟩`}{`⟨*step*⟩`}`. This leads to $\underset{\sim}{\underset{4}{\alpha}}$, $\boldsymbol{\alpha}$, resp. $\underset{\sim}{\underset{4}{\alpha}}$.

In the bold style, it is not distinguished between vectors, matrices, and tensors. I would like to use upright symbols but then you cannot use all symbols because there is no full upright bold math alphabet.

`\dcdot` The `\dcdot` command produces a double dot for double scalar products, e.g., $\vec{\vec{\sigma}} = \underset{\sim}{\underset{4}{A}} \cdot\cdot\, \vec{\vec{\varepsilon}}$.

`\trans` `\trans` produces a transponed sign: $\vec{\vec{A}}^{\mathrm{T}} = \vec{\vec{B}}$.

3 The implementation

Heading of the package:

```
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{hhtensor}
  [2011/12/29  v0.61  Print vectors and tensors]
```

`ushort` underlines with shorter lines than `\underline`.

```
\RequirePackage{ushort}
```

`amsmath` for bold symbols.

```
\RequirePackage{amsmath}
```

Booleans to decide which version has to be used.

```
\newif\iftensor@bold
\newif\iftensor@uline
```

Package options that set the booleans.

```
\DeclareOption{bold}{\tensor@boldtrue\tensor@ulinefalse}
\DeclareOption{uline}{\tensor@boldfalse\tensor@ulinetrue}
\DeclareOption{arrow}{\tensor@boldfalse\tensor@ulinefalse}
```

Default are arrows, as in standard LaTeX.

```
\ExecuteOptions{arrow}
\ProcessOptions\relax
```

`\origvec` Save the original `\vec` command.

```
\newcommand\origvec{}
\let\origvec=\vec
```

If bold vectors and tensors are requested, execute this code.

```
\iftensor@bold
```

`\vec` Redefine the `\vec` command.

```
  \DeclareRobustCommand*\vec[1]{\ensuremath{\boldsymbol{#1}}}
```

`\matr` Defined the `\matr` command.

```
  \DeclareRobustCommand*\matr[1]{\ensuremath{\boldsymbol{#1}}}
```

`\tens` Defined the `\tens` command.

```
  \DeclareRobustCommand*\tens[2]{\ensuremath{\boldsymbol{#1}}}
```

Underlined vectors?

```
\else
  \iftensor@uline
```

`\vec` Vectors underlined.

```
    \DeclareRobustCommand*\vec[1]{\ushort{#1}}
```

`\matr` Matrices double underlined.

```
    \DeclareRobustCommand*\matr[1]{\ushortd{#1}}
```

`\tens` Tensors with number of step below.

```
    \DeclareRobustCommand*\tens[2]{%
      \begingroup
        \setlength{\arraycolsep}{0pt}
        \begin{array}[t]{c}%
          #1 \\[-2.05ex]
          {\scriptstyle \sim} \\[-2.1ex]
          {\scriptscriptstyle #2}\\[-0.7ex]
        \end{array}%
      \endgroup
    }
```

Vectors with an arrow. Since this is the default, the `\vec` command has not to be redefined.

```
  \else
```

`\matr` Matrix.

```
    \DeclareRobustCommand*\matr[1]{\ensuremath{\vec{\vec{#1}}}}
```

`\tens` Tensors with number of step below. That does not fit well to the arrow styles, but I don't know a better solution. Does somebody have one?

```
    \DeclareRobustCommand*\tens[2]{%
      \begingroup
        \setlength{\arraycolsep}{0pt}
        \begin{array}[t]{c}%
          #1 \\[-2.05ex]
          {\scriptstyle \sim} \\[-2.1ex]
          {\scriptscriptstyle #2}\\[-0.7ex]
        \end{array}%
      \endgroup
    }

  \fi
\fi
```

`\dcdot` Double scalar product.

```
\DeclareRobustCommand*\dcdot{\mathrel{\cdot\mkern 0.0mu \cdot}}%
```

`\trans` Transformed sign.

```
\DeclareRobustCommand*\trans{^{\mathrm{T}}}
```

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.