

The hhtensor package*

Harald Harders
harald.harders@gmx.de

File Date 2011/12/29, Printed December 29, 2011

Abstract

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

Contents

1	Load the package	1
2	Usage	1
3	The implementation	2

Copyright

Copyright 2003–2011 Harald Harders.

This program can be redistributed and/or modified under the terms of the LaTeX Project Public License Distributed from CTAN archives in directory macros/latex/base/lppl.txt; either version 1 of the License, or any later version.

1 Load the package

To use this package place

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

in the preamble of your document. The $\langle style \rangle$ 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 <code>\vec{⟨symbol⟩}</code> command. Depending on the style, they are printed $\vec{\alpha}$, $\boldsymbol{\alpha}$, resp. $\underline{\alpha}$.
\matr	Matrices are printed using <code>\matr{⟨symbol⟩}</code> : $\vec{\alpha}$, $\boldsymbol{\alpha}$, resp. $\underline{\alpha}$.
\tens	Tensors are a little bit different. They take two arguments while the first one

*This file has version v0.61 last revised 2011/12/29.

is the symbol, while the second is the step: `\tens{<symbol>}{<step>}`. This leads to $\underline{\underline{\alpha}}$, α , resp. $\underline{\underline{\alpha}}$.

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., $\vec{\sigma} = \underline{\underline{A}} \cdots \vec{\varepsilon}$.

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

3 The implementation

Heading of the package:

```
1 \NeedsTeXFormat{LaTeX2e}
2 \ProvidesPackage{hhtensor}
3 [2011/12/29 v0.61 Print vectors and tensors]
```

ushort underlines with shorter lines than `\underline`.

```
4 \RequirePackage{ushort}
```

amsmath for bold symbols.

```
5 \RequirePackage{amsmath}
```

Booleans to decide which version has to be used.

```
6 \newif\iftensor@bold
7 \newif\iftensor@uline
```

Package options that set the booleans.

```
8 \DeclareOption{bold}{\tensor@boldtrue\tensor@ulinefalse}
9 \DeclareOption{uline}{\tensor@boldfalse\tensor@ulinettrue}
10 \DeclareOption{arrow}{\tensor@boldfalse\tensor@ulinefalse}
```

Default are arrows, as in standard L^AT_EX.

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

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

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

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

```
15 \iftensor@bold
```

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

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

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

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

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

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

Underlined vectors?

```

19 \else
20   \iftensor@uline

\vec  Vectors underlined.
21   \DeclareRobustCommand*\vec[1]{\ushort{#1}}

\matr Matrices double underlined.
22   \DeclareRobustCommand*\matr[1]{\ushortd{#1}}

\tens Tensors with number of step below.
23   \DeclareRobustCommand*\tens[2]{%
24     \begingroup
25       \setlength{\arraycolsep}{0pt}
26       \begin{array}[t]{c}%
27         #1 \ll[-2.05ex]
28         {\scriptstyle \sim} \ll[-2.1ex]
29         {\scriptscriptstyle #2}\ll[-0.7ex]
30       \end{array}%
31     \endgroup
32   }

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

\matr Matrix.
34   \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?
35   \DeclareRobustCommand*\tens[2]{%
36     \begingroup
37       \setlength{\arraycolsep}{0pt}
38       \begin{array}[t]{c}%
39         #1 \ll[-2.05ex]
40         {\scriptstyle \sim} \ll[-2.1ex]
41         {\scriptscriptstyle #2}\ll[-0.7ex]
42       \end{array}%
43     \endgroup
44   }

45   \fi
46 \fi

\dcdot Double scalar product.
47 \DeclareRobustCommand*\dcdot{\mathrel{\cdot\mkern 0.0mu \cdot}}%

\trans Transformed sign.
48 \DeclareRobustCommand*\trans{~{\mathrm{T}}}

```

Change History

0.6	0.61
General: Total new implementation	General: Avoid usage of <code>\fileversion</code> etc. 1

Index

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.

A	<code>\iftensor@uline</code> .. 7, 20	S
<code>\arraycolsep</code> 25, 37		<code>\scriptscriptstyle</code> .
	M	 29, 41
B	<code>\mathrel</code> 47	<code>\scriptstyle</code> 28, 40
<code>\begin</code> 26, 38	<code>\matr</code> 1, <u>17</u> , <u>22</u> , <u>34</u>	<code>\sim</code> 28, 40
<code>\boldsymbol</code> 16–18	<code>\mkern</code> 47	
	T	
C	N	<code>\tens</code> 1, <u>18</u> , <u>23</u> , <u>35</u>
<code>\cdot</code> 47	<code>\NeedsTeXFormat</code> 1	<code>\tensor@boldfalse</code> 9, 10
	O	<code>\tensor@boldtrue</code> ... 8
D	<code>\origvec</code> <u>13</u>	<code>\tensor@ulinefalse</code> 8, 10
<code>\dcdot</code> 2, <u>47</u>		<code>\tensor@ulinettrue</code> .. 9
<code>\DeclareOption</code> ... 8–10		<code>\trans</code> 2, <u>48</u>
	P	
E	<code>\ProcessOptions</code> ... 12	U
<code>\end</code> 30, 42	<code>\ProvidesPackage</code> ... 2	<code>\ushort</code> 21
<code>\ExecuteOptions</code> ... 11		<code>\ushortd</code> 22
	R	
I	<code>\RequirePackage</code> .. 4, 5	V
<code>\iftensor@bold</code> ... 6, 15		<code>\vec</code> ... 1, 14, <u>16</u> , <u>21</u> , 34