The package EASYVECTOR

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Abstract

The EASYVECTOR package is a simple macro package that provides a C-like syntax for writing vectors or matrices.

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The package **EASYVECTOR**

1 Some examples with **EASYVECTOR**

The package is loaded by means of the usual way:

\begin{verbatim}
\documentclass{article}
\usepackage[spacesep,definevectors]{easyvector}
\end{verbatim}

The package option `spacesep` means that the separator for the indices is the command `\smallspace` instead of “,” (comma).

The package option `definevectors` means that the command `\aa...,\zz` and `\AA...,\ZZ` are predefined as vectors. It also defines the commands `\Balpha`, `\Bbeta` and so on, as bold greek vectors. The latex commands `\aa,\AA,\gg,\ll,\ss,\SS,\tt` are saved in the commands `\oldxx` where `xx` is the name of the old command.

2 Use of the `\newvector` command

The general syntax of `\newvector` command is

\begin{verbatim}
\newvector[\cmda,\cmdb]{cmd}
\end{verbatim}

or

\begin{verbatim}
\newvector(a)[cmd]
\end{verbatim}

In the first case, it creates the new command (macro) `\cmd` which executes `\cmda` when in scalar mode and `\cmdb` when in vector mode. In the second case it creates a new command `\cmd` which substitutes the letter `\mathit{a}` when in scalar, mode and `\mathbf{a}` when in vector mode. Scalar mode is activated when `\cmd` is immediately followed by `[`. In scalar mode everything between `[` and `]` (with balancing) is assumed to be as an index. For example the commands
The package \texttt{EASYVECTOR}

\begin{verbatim}
\newvector[\alpha,\beta]\{W\}
\newvector[X,\mathbf{X}][X]
\[ \W = \{W[i,j]\}, \quad \X = \{X[i,j;k]\}\]
\end{verbatim}

\[ \beta = (\alpha_{i,j}), \quad \X = (X_{i,j}^k) \]

The structure of the \texttt{[...]} command is the following

[\i, \j, \ldots, \k; \x, \y, \ldots, \z]

where \i, \j, \ldots, \k are subscripts and \x, \y, \ldots, \z are superscripts. The comma “,” is used as a separator between different indices, and the semi-colon “;” separates subscripts and superscripts. There are no limits on the number of indices, and the code is reentrant, as the following example illustrates

\begin{verbatim}
\newvector(a)[av]
\newvector(b)[bv]
\[ \av = \begin{pmatrix} \av[1,1] & \av[1,2] \\ \av[2,1] & \av[2,2] \end{pmatrix}, \quad \bv = \left\{ b_{\gamma,k}^{i,j} \right\} \]
\end{verbatim}

\[ a = \begin{pmatrix} a_{1,1} & a_{1,2} \\ a_{2,1} & a_{2,2} \end{pmatrix}, \quad b = \left\{ b_{\gamma,k}^{i,j} \right\} \]

\section{Use of the \texttt{!} command}

It is possible to enforce vector mode also when using indices by using the character \texttt{!} before [

\begin{verbatim}
\newvector(z)[zzz]
\[ \zzz[1,2,3] \neq \zzz!{1,2,3} \]
\end{verbatim}

\[ z_{1,2,3} \neq z_{1,2,3} \]
4 Use of the \newcustomvector command

In some circumstances the command \newcustomvector can be useful. It is essentially the \newvector command with an extra argument that is a macro to manage the index part.

\def\myindex[#1,#2,#3]{{#1}_{#2}^{#3}}
\newcustomvector[\texttt{a},\mathbf{a}]{aaa}\myindex

\[ \aaa[1,2,3], \quad \aaa[3,2,1], \quad \aaa \]

Important: For old users (version < 0.6) the command \customindex is suppressed and the \newcustomvector is used instead.

5 The “definevectors” option

This option defines the following vectors for you:

\aa, \bb, ..., \zz \AA, \BB, ..., \ZZ
\Balpha, \Bbeta, ..., \Bomega

for example

\[ \Balpha[i,j], \quad \Balpha, \quad \BB[i,j], \quad \BB, \]

\[ \alpha_{i,j}, \quad \alpha, \quad B_{i,j}, \quad B, \]

6 The “@” convention

In linear algebra it is common to use the notation $A_{*,j}$ to denote the vector formed by the $j^{th}$ column of $A$. Note that $A$ is in vector format not in scalar format ($A$).
We can use “*” as an index in a vector forcing the vector mode by using @ as follows:

$$\{ \AA[@,j], \quad \Balpha[i,j;@] \}$$

\[ A_{\ast,j}, \quad \alpha_{i,j} \]