

hsrstud — HSR-Stud Style and Macros*

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Contents

1	Purpose of this package	2
2	Package Options	2
3	Summary notation	2
4	Default Theming	2
4.1	Links with <code>hyperref</code>	2
4.2	Source Code with <code>listings</code>	2
5	Mathematics	2
5.1	Vectors	2
5.1.1	Products	3
5.2	Matrices	3
5.3	Equalities	3
5.4	Derivatives	3
5.4.1	Differentials	3
5.4.2	Scalar functions	4
5.4.3	Vector functions	4
6	Colors	5
7	License	5
A	Implementation	6
A.1	Dependencies	6
A.2	Package options	7
A.3	Summary notation	7
A.4	Default theming	7
A.5	Mathematics	8
A.5.1	Vectors	8
A.5.2	Matrices and Tensors	9
A.5.3	Equalities	9
A.6	Derivatives	9
A.6.1	Differentials	9
A.6.2	Derivatives	9
A.6.3	Vector derivatives	9
A.7	Colors	10

*This file describes version v0.2, last revised 2021/08/04.

1 Purpose of this package

This package is made for the HSR Studenten organization to provide an easy to use interface to give a more consistent look and feel for the works produced by its the members. A secondary objective of this package is to eliminate the *many* dispersed duplicate .tex files that fill the repositories of the HSR-Stud org.

2 Package Options

dontrenew Do not renew existing L^AT_EX commands and environments. This is useful when the package is loaded on a document that is already partially written.

arrowvec Tells the package to use a vector notation with a small arrow over the variables, as it were handwritten.

textvecdiff Disables the “Nabla” or “Del” notation for vector derivatives. Instead the symbols $\nabla, \nabla \cdot, \nabla \times, \nabla^2, \nabla^2$ are be replaced with grad, div, curl and div grad.

3 Summary notation

4 Default Theming

4.1 Links with hyperref

Colors from [1] see
<https://intranet.hsr.ch>

```
1 Colors from
2 \cite{bib:hsrcolors} see \
3 \url{https://intranet.hsr.ch}
```

4.2 Source Code with listings

```
1 int main(int argc, char *argv[], char *envp[]) {
2     std::cout << "hello world" << std::endl;
3 }
```

```
1 \begin{lstlisting}[language=C++]
2 int main(int argc, char *argv[], char *envp[]) {
3     std::cout << "hello world" << std::endl;
4 }
5 \end{lstlisting}
```

5 Mathematics

5.1 Vectors

\vec Vectors notation. Aliases: **\v**, **\vc**. If the option **arrowvec** described in §2 is enabled, the notation with a small arrow over the variable will be used \vec{x} , otherwise the vector is bold **x**. Takes one option $\langle letter \rangle$. **\v** is renamed to **\vaccent** and **\vec** to **\oldvec**.

$$\mathbf{F} = m\mathbf{a}$$

```
1 \[ \vec{F} = m\vec{a} \]
```

\uvec Unit vector notation. Alias **\uv**. Takes $\langle letter \rangle$. It is implemented in terms of **\vec**, which means that the style is inherited.

$$\hat{\mathbf{x}} = \mathbf{x}/x \quad \begin{array}{l} 1 \quad \backslash [\quad \backslash \text{uvec}\{\mathbf{x}\} = \backslash \text{vec}\{\mathbf{x}\}/x \quad \backslash] \end{array}$$

5.1.1 Products

`\dotp` Dot product between vectors.

$$\mathbf{u} \cdot \mathbf{v} \quad \begin{array}{l} 1 \quad \backslash [\quad \backslash \text{vec}\{\mathbf{u}\} \backslash \text{dotp} \backslash \text{vec}\{\mathbf{v}\} \quad \backslash] \end{array}$$

`\crossp` Cross product between vectors.

$$\mathbf{u} \times \mathbf{v} \quad \begin{array}{l} 1 \quad \backslash [\quad \backslash \text{vec}\{\mathbf{u}\} \backslash \text{crossp} \backslash \text{vec}\{\mathbf{v}\} \quad \backslash] \end{array}$$

5.2 Matrices

`\mx` Matrix notation. Takes $\{\langle letter \rangle\}$.

$$\mathbf{J} = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \quad \begin{array}{l} 1 \quad \backslash [\\ 2 \quad \quad \backslash \text{mx}\{\mathbf{J}\} = \backslash \text{begin}\{\text{pmatrix}\} \\ 3 \quad \quad \quad 0 \ \& \ 1 \quad \backslash \backslash \\ 4 \quad \quad \quad 1 \ \& \ 0 \\ 5 \quad \quad \quad \backslash \text{end}\{\text{pmatrix}\} \\ 6 \quad \backslash] \end{array}$$

5.3 Equalities

`\heq` L'Hôpital limit equality symbol.

$$\lim_{x \rightarrow \infty} \frac{x}{x^2 - 1} \stackrel{\text{H}}{=} \lim_{x \rightarrow \infty} \frac{1}{2x} = 0 \quad \begin{array}{l} 1 \quad \backslash [\\ 2 \quad \quad \backslash \text{lim}_{\{x \rightarrow \infty\}} \backslash \text{frac}\{x\}\{x^2 - 1\} \\ 3 \quad \quad \quad \backslash \text{heq} \quad \backslash \text{lim}_{\{x \rightarrow \infty\}} \backslash \text{frac}\{1\}\{2x\} \\ 4 \quad \quad \quad = 0 \\ 5 \quad \backslash] \end{array}$$

5.4 Derivatives

5.4.1 Differentials

`\dd` The differential element. It needs a $\{\langle var \rangle\}$ and has the optional argument $[\langle order \rangle]$.

$$dx \quad d^4x \quad \begin{array}{l} 1 \quad \backslash [\quad \backslash \text{dd}\{\mathbf{x}\} \quad \backslash \text{quad} \quad \backslash \text{dd}[4]\{\mathbf{x}\} \quad \backslash] \end{array}$$

`\di` This is the same as `\dd` but with a small space in front, it is intended to be used in integrals for a nicer typesetting.

$$I = \int \mathbf{J} \cdot d\mathbf{s}$$

$$= \iint \mathbf{J} \cdot \hat{\mathbf{n}} dx dy$$

```

1 \begin{align*}
2   I &= \int \vec{J} \cdot d\vec{s} \\
3   &= \iint \vec{J} \cdot \vec{n} dx dy
4 \end{align*}

```

5.4.2 Scalar functions

`\deriv` The derivative has arguments $\{\langle function \rangle\}$, $\{\langle var \rangle\}$ and the optional argument $[\langle order \rangle]$.

$$\frac{dy}{dx} \quad \frac{d^3y}{dx^3}$$

```

1 \[
2   \deriv{y}{x} \quad \code{\\quad}
3   \deriv[3]{y}{x}
4 \]

```

`\pderiv` The partial derivative has arguments $\{\langle function \rangle\}$, $\{\langle var \rangle\}$ and the optional argument $[\langle order \rangle]$.

$$\frac{\partial y}{\partial x} \quad \frac{\partial^3 y}{\partial x^3}$$

```

1 \[
2   \pderiv{y}{x} \quad \code{\\quad}
3   \pderiv[3]{y}{x}
4 \]

```

5.4.3 Vector functions

`\grad` The gradient vector operator.

$$\nabla f$$

```

1 \[ \grad f \]

```

`\div` The divergence operator, `\div` is renamed to `\divsymb`. If the option `donotrenew` is used `\divg` is also available.

$$\nabla \cdot \mathbf{f}$$

```

1 \[ \div \vec{f} \]

```

`\curl` The curl operator.

$$\nabla \times \mathbf{f}$$

```

1 \[ \curl \vec{f} \]

```

`\laplacian` The laplacian operator.

$$\nabla^2 f$$

```









1 \[
2   \laplacian f
3 \]

```

`\vlaplacian` The vector laplacian operator operator.

		1 \[
	$\nabla^2 F$	2 \vlaplacian \vec{F}
		3 \]

6 Colors

hsr-blue		80	60	40	20
hsr-mauve		80	60	40	20
hsr-lakegreen		80	60	40	20
hsr-reed		80	60	40	20
hsr-petrol		80	60	40	20
hsr-basswood		80	60	40	20
hsr-lightgrey		80	60	40	20
hsr-black		80	60	40	20

7 License

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References

- [1] HSR Intern: Corporate Design / Farben, *Hochschule für Technik Rapperswil*, <https://intranet.hsr.ch/Farben.7715.0.html>

Change History

v0.1		v0.2
General: Initial draft 1		General: Remove legacy code and update notation 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.

Symbols	<code>\@hsrdivf</code> 137, 139, 142, 145
<code>\,</code>	124	

<code>\@hsruvecf</code>	E	98, 106, 107, 108,
.. 108, 110, 113, 114	<code>\else</code> ...	113, 114, 118,
<code>\@hsrvecf</code>	143, 152, 160, 166	119, 121, 122,
89, 91, 94, 100, 101	F	123, 124, 125,
B	<code>\fi</code>	126, 131, 137, 139
<code>\baselineskip</code>	92, 102,	<code>\notesref</code>
<code>\bm</code>	111, 132, 140,	38
<code>\boldsymbol</code> ...	146, 154, 162, 168	O
<code>\bookref</code>	<code>\footnotesize</code>	<code>\oldvec</code>
37	<code>\frac</code>	98
	125, 126	<code>\operatorname</code>
		145
C	G	P
<code>\cdot</code>	<code>\grad</code>	<code>\parindent</code>
118	1, 129, 131	56
<code>\color</code> 60, 62, 71, 72, 73, 74	H	<code>\partial</code>
<code>\crosssp</code>	<code>\hat</code>	126
1, 119, 153	106, 107, 122	<code>\PassOptionsToPackage</code> .
<code>\curl</code>	<code>\heq</code>	7
1, 151, 153	1, 122	<code>\pderiv</code>
	<code>\hookrightarrow</code>	1, 126
	68	<code>\ProcessLocalKeyvalOptions</code>
D	<code>\hsruvecarrow</code> ..	35
<code>\dd</code>	107, 110	
1, 123, 124, 125	<code>\hsruvecbold</code> ..	R
<code>\DeclareBoolOption</code> .	106, 108	<code>\renewcommand</code>
..... 23, 26, 30	<code>\hsrvecarrow</code>	91, 100, 101, 110, 145
<code>\DeclareComplementaryOption</code>	<code>\hsrvecbold</code>	<code>\RequirePackage</code>
..... 27, 31	<code>\hypersetup</code> 2, 3, 4, 6,
<code>\DeclareMathOperator</code>	I	8, 10, 11, 12, 14, 15
..... 129,	<code>\ifhsr@arrowvec</code> .	S
142, 151, 153,	<code>\ifhsr@dontrenew</code> 95, 143	<code>\SetupKeyvalOptions</code> .
159, 161, 165, 167	<code>\ifhsr@textvecdiff</code> .	17
<code>\definecolor</code> 128,	<code>\small</code>
.. 170, 171, 172,	136, 150, 158, 164	70
173, 174, 176,	L	<code>\space</code>
177, 178, 179,	<code>\laplacian</code> ..	68
180, 182, 183,	1, 159, 161	<code>\stackrel</code>
184, 185, 186,	<code>\lectureref</code>	122
188, 189, 190,	39	T
191, 192, 194,	<code>\let</code>	<code>\textcolor</code> .
195, 196, 197,	144	37, 38, 39, 68
198, 200, 201,	<code>\lstdefinlanguage</code> ..	<code>\texttt</code> ...
202, 203, 204,	78	37, 38, 39, 122
206, 207, 208,	<code>\lstdefinestyle</code>	<code>\times</code>
209, 210, 212,	50	119
213, 214, 215, 216	<code>\lstset</code>	60, 70
<code>\deriv</code>	M	U
1, 125	<code>\mathbf</code>	<code>\uv</code>
<code>\di</code>	86	113
1, 124	<code>\mathrm</code> .	<code>\uvec</code>
<code>\div</code>	87, 107, 121, 123	1, 114
1, 144, 145	<code>\mbox</code>	V
<code>\divg</code>	68	<code>\v</code>
142	<code>\mx</code>	97, 100
<code>\divsymb</code>	1, 121	<code>\vaccent</code>
144	N	97
<code>\dotp</code>	<code>\nabla</code>	<code>\vc</code>
1, 118, 139	131,	94
	139, 153, 161, 167	<code>\vec</code> .
	<code>\newcommand</code> 37, 38, 39,	1, 98, 101, 106,
	86, 87, 89, 94, 97,	131, 139, 153, 167
		<code>\vlaplacian</code> .
		1, 165, 167
		<code>\vv</code>
		87

A Implementation

hsrstud package implementation with inline documentation

A.1 Dependencies

```

1 %% Dependencies ((
2 \RequirePackage{amsmath}
3 \RequirePackage{amssymb}
4 \RequirePackage{bm}

```

```

5
6 \RequirePackage{esint}
7 \PassOptionsToPackage{b}{esvect}
8 \RequirePackage{esvect}
9
10 \RequirePackage{xcolor}
11 \RequirePackage{hyperref}
12 \RequirePackage{listings}
13
14 \RequirePackage{iftex}
15 \RequirePackage{kvoptions}
16 %% ))

```

A.2 Package options

```

17 \SetupKeyvalOptions{
18     family=hsr,
19     prefix=hsr@
20 }
21
22 %% Do not renew LaTeX Macros
23 \DeclareBoolOption[false]{dontrenew}
24
25 %% Vector style
26 \DeclareBoolOption[false]{arrowvec}
27 \DeclareComplementaryOption{boldvec}{arrowvec}
28
29 %% Vector derivative style
30 \DeclareBoolOption[false]{textvecdiff}
31 \DeclareComplementaryOption{delvecdiff}{textvecdiff}
32
33
34 %% Process options
35 \ProcessLocalKeyvalOptions*

```

A.3 Summary notation

```

36 %% TODO: change letters in german
37 \newcommand{\bookref}[1]{\texttt{\textcolor{hsr-mauve}{P.#1}}}
38 \newcommand{\notesref}[1]{\texttt{\textcolor{hsr-blue}{S.#1}}}
39 \newcommand{\lectureref}[1]{\texttt{\textcolor{hsr-lakegreen}{L.#1}}}

```

A.4 Default theming

```

40 %% Theming for hyperref and listings ((
41 \hypersetup{
42     colorlinks=true,
43     linkcolor=hsr-black,
44     citecolor=hsr-mauve,
45     filecolor=hsr-black,
46     urlcolor=hsr-blue,
47 }
48
49 %% Common listings settings
50 \lstdefinestyle{hsr-base}{
51     belowcaptionskip=\baselineskip,
52     breaklines=true,
53     frame=none,
54     inputencoding=utf8,
55     % margin
56     xleftmargin=\parindent,
57     % numbers
58     numbers=left,

```

```

59     numbersep=5pt,
60     numberstyle=\ttfamily\footnotesize\color{hsr-black40},
61     % background
62     backgroundcolor=\color{white},
63     showstringspaces=false,
64     % default language
65     language=[LaTeX]TeX,
66     % break long lines, and show an arrow where the line was broken
67     breaklines=true,
68     postbreak=\mbox{\textcolor{hsr-blue}{$\hookrightarrow$}\space},
69     % font
70     basicstyle=\ttfamily\small,
71     identifierstyle=\color{hsr-black},
72     keywordstyle=\color{hsr-blue},
73     commentstyle=\color{hsr-black40},
74     stringstyle=\color{hsr-mauve80},
75 }
76
77 %% Define missing languages / aliases
78 \lstdefinelanguage{LaTeX}{
79     language=[LaTeX]Tex
80 }
81
82 %% Set style
83 \lstset{style=hsr-base, escapechar=`}
84 %))

```

A.5 Mathematics

A.5.1 Vectors

```

85 %% Vector ((
86 \newcommand{\hsrvecbold}[1]{\mathbf{\bm{#1}}}
87 \newcommand{\hsrvecarrow}[1]{\vv{\mathrm{#1}}} % from esvect
88
89 \newcommand{\@hsrvecf}[1]{\hsrvecbold{#1}}
90 \ifhsr@arrowvec
91     \renewcommand{\@hsrvecf}[1]{\hsrvecarrow{#1}}
92 \fi
93
94 \newcommand{\vc}{\@hsrvecf}
95 \ifhsr@dontrenew\else
96     % save previous command
97     \newcommand{\vaccent}{\v}
98     \newcommand{\oldvec}{\vec}
99     % redefine
100    \renewcommand{\v}[1]{\@hsrvecf{#1}}
101    \renewcommand{\vec}[1]{\@hsrvecf{#1}}
102 \fi
103 %))
104
105 %% Unit vector ((
106 \newcommand{\hsruvecbold}[1]{\vec{\hat{#1}}}
107 \newcommand{\hsruvecarrow}[1]{\hat{\mathrm{#1}}}
108 \newcommand{\@hsruvecf}[1]{\hsruvecbold{#1}}
109 \ifhsr@arrowvec
110     \renewcommand{\@hsruvecf}[1]{\hsruvecarrow{#1}}
111 \fi
112
113 \newcommand{\uv}[1]{\@hsruvecf{#1}}
114 \newcommand{\uvec}[1]{\@hsruvecf{#1}}
115 %))

```



```

116
117 %% Products ((
118 \newcommand{\dotp}{\boldsymbol\cdot}
119 \newcommand{\crossp}{\boldsymbol\times}
120 %))

A.5.2 Matrices and Tensors

121 \newcommand{\mx}[1]{\bm{\mathrm{#1}}}

A.5.3 Equalities

122 \newcommand{\heq}{\stackrel{\texttt{H}}{=}}

A.6 Derivatives

A.6.1 Differentials

123 \newcommand{\dd}[2][\mathrm{d}^{\#1} \#2}
124 \newcommand{\di}[2][\,\mathrm{d}\#1\#2}

A.6.2 Derivatives

125 \newcommand{\deriv}[3][\frac{\dd{\#1\#2}}{\dd{\#3^{\#1}}}]
126 \newcommand{\pderiv}[3][\frac{\partial^{\#1} \#2}{\partial \#3^{\#1}}]

A.6.3 Vector derivatives

127 %% Gradient ((
128 \ifhsr@textvecdiff
129   \DeclareMathOperator{\grad}{grad}
130 \else
131   \newcommand{\grad}{\vec{\nabla}}
132 \fi
133 %% ))
134
135 %% Divergence ((
136 \ifhsr@textvecdiff
137   \newcommand{@hsrdivf}{div}
138 \else
139   \newcommand{@hsrdivf}{\vec{\nabla}\dotp}
140 \fi
141
142 \DeclareMathOperator{\divg}{@hsrdivf}
143 \ifhsr@dontrenew\else
144   \let\divsym=\div
145   \renewcommand{\div}{\operatorname{@hsrdivf}}
146 \fi
147 %% ))
148
149 %% Curl ((
150 \ifhsr@textvecdiff
151   \DeclareMathOperator{\curl}{curl}
152 \else
153   \DeclareMathOperator{\curl}{\vec{\nabla}\crossp}
154 \fi
155 %% ))
156
157 %% laplacian ((
158 \ifhsr@textvecdiff
159   \DeclareMathOperator{\laplacian}{div grad}
160 \else
161   \DeclareMathOperator{\laplacian}{\nabla^2}
162 \fi
163
164 \ifhsr@textvecdiff

```

```

165 \DeclareMathOperator{\vlaplacian}{div grad}
166 \else
167 \DeclareMathOperator{\vlaplacian}{\vec{\nabla}^2}
168 \fi
169 %% ))

```

A.7 Colors

```

170 \definecolor{hsr-blue}{HTML}{0065A3}
171 \definecolor{hsr-blue80}{HTML}{3384B5}
172 \definecolor{hsr-blue60}{HTML}{66A3C8}
173 \definecolor{hsr-blue40}{HTML}{99C1DA}
174 \definecolor{hsr-blue20}{HTML}{CCE0ED}
175
176 \definecolor{hsr-mauve}{HTML}{6E1C50}
177 \definecolor{hsr-mauve80}{HTML}{8B4973}
178 \definecolor{hsr-mauve60}{HTML}{A87796}
179 \definecolor{hsr-mauve40}{HTML}{C5A4B9}
180 \definecolor{hsr-mauve20}{HTML}{E2D2DC}
181
182 \definecolor{hsr-lakegreen}{HTML}{548C86}
183 \definecolor{hsr-lakegreen80}{HTML}{76A39E}
184 \definecolor{hsr-lakegreen60}{HTML}{98BAB6}
185 \definecolor{hsr-lakegreen40}{HTML}{BBD1CF}
186 \definecolor{hsr-lakegreen20}{HTML}{DDE8E7}
187
188 \definecolor{hsr-reed}{HTML}{7B6951}
189 \definecolor{hsr-reed80}{HTML}{958774}
190 \definecolor{hsr-reed60}{HTML}{B0A597}
191 \definecolor{hsr-reed40}{HTML}{CAC3B9}
192 \definecolor{hsr-reed20}{HTML}{E5E1DC}
193
194 \definecolor{hsr-petrol}{HTML}{00738D}
195 \definecolor{hsr-petrol80}{HTML}{338FA4}
196 \definecolor{hsr-petrol60}{HTML}{66ABBB}
197 \definecolor{hsr-petrol40}{HTML}{99C7D1}
198 \definecolor{hsr-petrol20}{HTML}{CCE3E8}
199
200 \definecolor{hsr-basswood}{HTML}{BABD5D}
201 \definecolor{hsr-basswood80}{HTML}{C8CA7D}
202 \definecolor{hsr-basswood60}{HTML}{D6D79E}
203 \definecolor{hsr-basswood40}{HTML}{E3E5BE}
204 \definecolor{hsr-basswood20}{HTML}{F1F2DF}
205
206 \definecolor{hsr-lightgrey}{HTML}{C6C7C8}
207 \definecolor{hsr-lightgrey80}{HTML}{D1D2D3}
208 \definecolor{hsr-lightgrey60}{HTML}{DDDDDE}
209 \definecolor{hsr-lightgrey40}{HTML}{E8E8E9}
210 \definecolor{hsr-lightgrey20}{HTML}{F4F4F4}
211
212 \definecolor{hsr-black}{HTML}{1A171B}
213 \definecolor{hsr-black80}{HTML}{484549}
214 \definecolor{hsr-black60}{HTML}{767476}
215 \definecolor{hsr-black40}{HTML}{A4A2A4}
216 \definecolor{hsr-black20}{HTML}{D1D1D1}

```