

hsrstud — HSR-Stud Style and Macros*

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*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 `\divsym`. 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

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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.

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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}

```