

# 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<sup>A</sup>T<sub>E</sub>X commands and environments. This is useful when the package is loaded on a document that is already partiall 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.

$$\hat{\mathbf{x}} = \mathbf{x}/x \quad \text{1} \quad \backslash[ \quad \backslash u\text{vec}\{\mathbf{x}\} = \backslash\text{vec}\{\mathbf{x}\}/x \quad \backslash]$$

### 5.1.1 Products

`\dotp` Dot product between vectors.

$$\mathbf{u} \cdot \mathbf{v} \quad \text{1} \quad \backslash[ \quad \backslash\text{vec}\{\mathbf{u}\}\backslash\dot{p}\backslash\text{vec}\{\mathbf{v}\} \quad \backslash]$$

`\crossp` Cross product between vectors.

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

## 5.2 Matrices

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

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

## 5.3 Equalities

`\heq` L'Hôpital limit equality symbol.

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

## 5.4 Derivatives

### 5.4.1 Differentials

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

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

`\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.

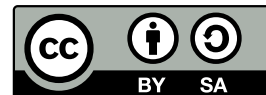
	$\nabla^2 F$	1	\[	
		2		\vlaplacian \vec{F}
		3	\]	

## 6 Colors

<b>hsr-blue</b>		80	60	40	20
<b>hsr-mauve</b>		80	60	40	20
<b>hsr-lakegreen</b>		80	60	40	20
<b>hsr-reed</b>		80	60	40	20
<b>hsr-petrol</b>		80	60	40	20
<b>hsr-basswood</b>		80	60	40	20
<b>hsr-lightgrey</b>		80	60	40	20
<b>hsr-black</b>		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.

<b>C</b>	<b>D</b>
\curl . . . . . <u>1</u>	\dd . . . . . <u>1</u>
\crossp . . . . . <u>1</u>	

$\backslash$ deriv	..... 1	H	P		
$\backslash$ di	..... 1	$\backslash$ heq	..... 1 $\backslash$ pderiv	..... 1	
$\backslash$ div	..... 1		U		
$\backslash$ dotp	..... 1	L	$\backslash$ uvec	..... 1	
		$\backslash$ laplacian	..... 1		
	G	M	V		
$\backslash$ grad	..... 1	$\backslash$ mx	..... 1	$\backslash$ vec	..... 1
			$\backslash$ vlaplacian	..... 1	

## 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{\hat{\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\divsymb=\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}

```