

# hsrstud — HSR-Stud Style and Macros\*

Naoki Pross <npross@hsr.ch>

Released 2020/04/16

## Contents

<b>1</b>	<b>Purpose of this package</b>	<b>2</b>
<b>2</b>	<b>Dependencies</b>	<b>2</b>
<b>3</b>	<b>Package Options</b>	<b>2</b>
<b>4</b>	<b>Default Theming</b>	<b>2</b>
4.1	Links with <code>hyperref</code> . . . . .	2
4.2	Source Code with <code>listings</code> . . . . .	2
<b>5</b>	<b>Mathematics</b>	<b>2</b>
5.1	Vectors . . . . .	2
5.1.1	Products . . . . .	3
5.2	Matrices and Tensors . . . . .	3
5.3	Equalities . . . . .	3
5.4	Derivatives . . . . .	3
5.4.1	Differentials . . . . .	3
5.4.2	Classical . . . . .	4
5.4.3	Vector . . . . .	4
<b>6</b>	<b>Colors</b>	<b>5</b>
<b>7</b>	<b>Implementation</b>	<b>5</b>
7.1	Dependencies . . . . .	5
7.2	Package options . . . . .	5
7.3	Default theming . . . . .	5
7.4	Mathematics . . . . .	6
7.4.1	Vectors . . . . .	6
7.4.2	Matrices and Tensors . . . . .	7
7.4.3	Equalities . . . . .	7
7.5	Derivatives . . . . .	7
7.5.1	Differentials . . . . .	7
7.5.2	Derivatives . . . . .	7
7.5.3	Vector derivatives . . . . .	7
7.6	Colors . . . . .	7

## 1 Purpose of this package

This package is made for the HSR Studenten organization to provide a consistent style and source syntax across documents.

---

\*This file describes version v0.1, last revised 2020/04/16.

## 2 Dependencies

The following packages are automatically loaded and do not need to be set up.

## 3 Package Options

**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  $\nabla, \nabla \cdot, \nabla \times, \nabla^2$  are replaced with grad, div, curl and div grad.

## 4 Default Theming

### 4.1 Links with hyperref

Colors from [1] see <a href="https://intranet.hsr.ch">https://intranet.hsr.ch</a>	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, \v** Vectors notation. If the option **arrowvec** described in §3 is enabled, the notation with a small arrow over the variable will be used  $\vec{x}$ , otherwise the vector is bold  $\mathbf{x}$ . Takes one option  $\langle letter \rangle$ .

$\mathbf{F} = m\mathbf{a}$	1 \[ \vec{F} = m\vec{a} \]
----------------------------	----------------------------

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

$\hat{\mathbf{x}} = \mathbf{x}/x$	1 \[ \uvec{x} = \vec{x}/x \]
-----------------------------------	------------------------------

#### 5.1.1 Products

**\dotp** Dot product between vectors.

$\mathbf{u} \cdot \mathbf{v}$	<pre>1 \[ \vec{u}\dotp\vec{v} \]</pre>
-------------------------------	--

`\crossp`, `\cross` Cross product between vectors.

$\mathbf{u} \times \mathbf{v}$	<pre>1 \[ \vec{u}\cross\vec{v} \]</pre>
--------------------------------	---

## 5.2 Matrices and Tensors

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

$J = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$	<pre>1 \[ 2   \mtx{J} = \begin{pmatrix} 3       0 &amp; 1 \\ 4       1 &amp; 0 5   \end{pmatrix} 6 \]</pre>
--	---

`\ten` Tensor notation. Takes  $\{\langle letter \rangle\}$ .

$\mathbf{T}^{(n)} = \hat{\mathbf{n}} \cdot \underline{\boldsymbol{\sigma}}$	<pre>1 \[ 2   \vec{T}^{(\vec{n})} = 3   \uvec{n}\dotp\ten{\sigma} 4 \]</pre>
---	--

## 5.3 Equalities

`\heq` L'Hôpital limit equality symbol.

$\lim_{x \rightarrow \infty} \frac{x}{x^2 - 1} \stackrel{H}{=} \lim_{x \rightarrow \infty} \frac{1}{2x} = 0$	<pre>1 \[ 2   \lim_{x \to \infty} \frac{x}{x^2 - 1} 3   \heq \lim_{x \to \infty} \frac{1}{2x} 4   = 0 5 \]</pre>
--	--

## 5.4 Derivatives

### 5.4.1 Differentials

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

$dx \quad d^4x$	<pre>1 \[ \dd{x} \quad \quad \quad \dd[4]{x} \]</pre>
-----------------	---

`\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.

$I = \int \mathbf{J} \cdot d\mathbf{s}$ $= \iint \mathbf{J} \cdot \hat{\mathbf{n}} \, dx \, dy$	<pre>1 \begin{align*} 2   I &amp;= \int \vec{J} \dotp \dd 3       \{\vec{s}\} \\ 4   &amp;= \iint \vec{J} \dotp \uvec{n} \di{x} \di{y} 5 \end{align*}</pre>
---	---

### 5.4.2 Classical

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

		1 \[
	$\frac{dy}{dx}$	2 \deriv{y}{x} \quad \code{\qquad}
	$\frac{d^3y}{dx^3}$	3 \deriv[3]{y}{x}
		4 \]

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

		1 \[
	$\frac{\partial y}{\partial x}$	2 \pderiv{y}{x} \quad \code{\qquad}
	$\frac{\partial^3 y}{\partial x^3}$	3 \pderiv[3]{y}{x}
		4 \]

### 5.4.3 Vector

`\grad` The gradient operator.

	$\nabla f$	1 \[ \grad f \]
--	------------	-----------------

`\div` The divergence operator, `\div` is renamed to `\divsym`.

	$\nabla \cdot f$	1 \[ \div f \]
--	------------------	----------------









`\curl` The curl operator.

	$\nabla \times f$	1 \[ \curl f \]
--	-------------------	-----------------

`\laplace` The laplace operator.

	$\nabla^2 f$	1 \[ \laplace f \]
--	--------------	--------------------

## 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 Implementation

### 7.1 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 %% ))

```

### 7.2 Package options

```

14 \newif\if@arrowvec\@arrowvecfalse
15 \DeclareOption{arrowvec}{\@arrowvectrue}
16
17 \newif\if@textvecdiff\@textvecdifffalse
18 \DeclareOption{textvecdiff}{\@textvecdifftrue}
19
20 \ProcessOptions\relax

```

### 7.3 Default theming

```

21 %% Theming for hyperref and listings ((
22 \hypersetup{
23   colorlinks=true,
24   linkcolor=hsr-black,
25   citecolor=hsr-mauve,
26   filecolor=hsr-black,
27   urlcolor=hsr-blue,
28 }
29

```

```

30 %% Common listings settings
31 \lstdefinestyle{hsr-base}{
32     belowcaptionskip=\baselineskip,
33     breaklines=true,
34     frame=none,
35     inputencoding=utf8,
36     % margin
37     xleftmargin=\parindent,
38     % numbers
39     numbers=left,
40     numbersep=5pt,
41     numberstyle=\ttfamily\footnotesize\color{hsr-black40},
42     % background
43     backgroundcolor=\color{white},
44     showstringspaces=false,
45     % default language
46     language=[LaTeX]TeX,
47     % font
48     basicstyle=\ttfamily\small,
49     identifierstyle=\color{hsr-black},
50     keywordstyle=\color{hsr-blue},
51     commentstyle=\color{hsr-black40},
52     stringstyle=\color{hsr-mauve80},
53 }
54
55 %% Define missing languages / aliases
56 \lstdefinelanguage{LaTeX}{
57     language=[LaTeX]TeX
58 }
59
60 %% Set style
61 \lstset{style=hsr-base, escapechar=`}
62 %%)

```

## 7.4 Mathematics

### 7.4.1 Vectors

```

63 %% Vector ((
64 \newcommand{\hsrvecbold}[1]{\mathbf{\boldsymbol{#1}}}
65 \newcommand{\hsrvecarrow}[1]{\vv{\mathrm{#1}}} % from esvect
66 \newcommand{\@hsrvecf}[1]{\hsrvecbold{#1}}
67 \if@arrowvec
68     \renewcommand{\@hsrvecf}[1]{\hsrvecarrow{#1}}
69 \fi
70
71 % save previous command
72 \newcommand{\vaccent}{\v}
73 \newcommand{\oldvec}{\vec}
74 % redefine
75 \renewcommand{\v}[1]{\@hsrvecf{#1}}
76 \renewcommand{\vec}[1]{\@hsrvecf{#1}}
77 %%)
78
79 %% Unit vector ((
80 \newcommand{\hsruvecbold}[1]{\vec{\hat{#1}}}
81 \newcommand{\hsruvecarrow}[1]{\hat{\mathrm{#1}}}
82 \newcommand{\@hsruvecf}[1]{\hsruvecbold{#1}}
83 \if@arrowvec
84     \renewcommand{\@hsruvecf}[1]{\hsruvecarrow{#1}}
85 \fi
86

```

```

87 \newcommand{\uv}[1]{\@hsruvecf{#1}}
88 \newcommand{\uvec}[1]{\@hsruvecf{#1}}
89 %%)
90
91 %% Products ((
92 \newcommand{\dotp}{\boldsymbol\cdot}
93 \newcommand{\crossp}{\boldsymbol\times}
94 \newcommand{\cross}{\crossp}
95 %%)

```

#### 7.4.2 Matrices and Tensors

```

96 \newcommand{\mtx}[1]{\mathrm{#1}}
97 \newcommand{\ten}[1]{\underline{\mathbf{\boldsymbol{#1}}}}

```

#### 7.4.3 Equalities

```

98 \newcommand{\heq}{\stackrel{\hat{\texttt{H}}}{=}}

```

### 7.5 Derivatives

#### 7.5.1 Differentials

```

99 \newcommand{\dd}[2][\mathrm{d}^{\#1} \ #2}
100 \newcommand{\di}[2][\ , \dd{#1}{#2}}

```

#### 7.5.2 Derivatives

```

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

```

#### 7.5.3 Vector derivatives

```

103 \if@textvecdiff
104   \newcommand{\grad}{\text{grad }}
105 \else
106   \newcommand{\grad}{\nabla}%
107 \fi
108
109 \let\divsymb=\div
110 \if@textvecdiff
111   \renewcommand{\div}{\text{div}}
112 \else
113   \renewcommand{\div}{\nabla\cdot}
114 \fi
115
116 \if@textvecdiff
117   \newcommand{\curl}{\text{curl }}
118 \else
119   \newcommand{\curl}{\nabla\times}
120 \fi
121
122 \if@textvecdiff
123   \newcommand{\laplace}{\text{div grad}}
124 \else
125   \newcommand{\laplace}{\nabla^2}
126 \fi

```

### 7.6 Colors

```

127 \definecolor{hsr-blue}{HTML}{0065A3}
128 \definecolor{hsr-blue80}{HTML}{3384B5}
129 \definecolor{hsr-blue60}{HTML}{66A3C8}
130 \definecolor{hsr-blue40}{HTML}{99C1DA}
131 \definecolor{hsr-blue20}{HTML}{CCE0ED}
132

```

```

133 \definecolor{hsr-mauve}{HTML}{6E1C50}
134 \definecolor{hsr-mauve80}{HTML}{8B4973}
135 \definecolor{hsr-mauve60}{HTML}{A87796}
136 \definecolor{hsr-mauve40}{HTML}{C5A4B9}
137 \definecolor{hsr-mauve20}{HTML}{E2D2DC}
138
139 \definecolor{hsr-lakegreen}{HTML}{548C86}
140 \definecolor{hsr-lakegreen80}{HTML}{76A39E}
141 \definecolor{hsr-lakegreen60}{HTML}{98BAB6}
142 \definecolor{hsr-lakegreen40}{HTML}{BBD1CF}
143 \definecolor{hsr-lakegreen20}{HTML}{DDE8E7}
144
145 \definecolor{hsr-reed}{HTML}{7B6951}
146 \definecolor{hsr-reed80}{HTML}{958774}
147 \definecolor{hsr-reed60}{HTML}{B0A597}
148 \definecolor{hsr-reed40}{HTML}{CAC3B9}
149 \definecolor{hsr-reed20}{HTML}{E5E1DC}
150
151 \definecolor{hsr-petrol}{HTML}{00738D}
152 \definecolor{hsr-petrol80}{HTML}{338FA4}
153 \definecolor{hsr-petrol60}{HTML}{66ABBB}
154 \definecolor{hsr-petrol40}{HTML}{99C7D1}
155 \definecolor{hsr-petrol20}{HTML}{CCE3E8}
156
157 \definecolor{hsr-basswood}{HTML}{BABD5D}
158 \definecolor{hsr-basswood80}{HTML}{C8CA7D}
159 \definecolor{hsr-basswood60}{HTML}{D6D79E}
160 \definecolor{hsr-basswood40}{HTML}{E3E5BE}
161 \definecolor{hsr-basswood20}{HTML}{F1F2DF}
162
163 \definecolor{hsr-lightgrey}{HTML}{C6C7C8}
164 \definecolor{hsr-lightgrey80}{HTML}{D1D2D3}
165 \definecolor{hsr-lightgrey60}{HTML}{DDDDDE}
166 \definecolor{hsr-lightgrey40}{HTML}{E8E8E9}
167 \definecolor{hsr-lightgrey20}{HTML}{F4F4F4}
168
169 \definecolor{hsr-black}{HTML}{1A171B}
170 \definecolor{hsr-black80}{HTML}{484549}
171 \definecolor{hsr-black60}{HTML}{767476}
172 \definecolor{hsr-black40}{HTML}{A4A2A4}
173 \definecolor{hsr-black20}{HTML}{D1D1D1}

```

## References

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

## License

This work is licensed under a [Creative Commons](#)  
 “Attribution-NonCommercial-ShareAlike 4.0 International” license.

