

# hsrstud — HSR-Stud Style and Macros\*

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## 1 Purpose of this package

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

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\*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

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

## 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, \v, \vc** 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 **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, \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.

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

$$\mathbf{u} \times \mathbf{v}$$

```
1 \[ \vec{u}\cross\vec{v} \]
```

## 5.2 Matrices and Tensors

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

$$\mathbf{J} = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$$

```
1 \[
2   \mtx{J} = \begin{pmatrix}
3       0 & 1 \\
4       1 & 0
5   \end{pmatrix}
6 \]
```

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

$$\mathbf{T}^{(n)} = \hat{\mathbf{n}} \cdot \underline{\boldsymbol{\sigma}}$$

```
1 \[
2   \vec{T}^{(\vec{n})} =
3   \uvec{n}\dotp\ten{\sigma}
4 \]
```

## 5.3 Equalities

`\heq` L'Hôpital limit equality symbol.

$$\lim_{x \rightarrow \infty} \frac{x}{x^2 - 1} \stackrel{\text{H}}{=} \lim_{x \rightarrow \infty} \frac{1}{2x} = 0$$

```
1 \[
2   \lim_{x\to\infty} \frac{x
3   }{x^2 - 1}
4   \heq \lim_{x\to\infty}
5   \frac{1}{2x}
6   = 0
7 \]
```

## 5.4 Derivatives

### 5.4.1 Differentials

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

$$dx \quad d^4x$$

```
1 \[ \dd{x} \quad \quad \dd[4]{x} \]
```

`\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} \dotp \dd
3   \{\vec{s}\} \\
4   &= \iint \vec{J} \dotp \uvec{n} \di{x} \di{y}
5 \end{align*}
```

### 5.4.2 Classical

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

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

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

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

### 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
14 \RequirePackage{iftex}
15 \RequirePackage{kvoptions}
16 %% ))

```

### 7.2 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*

```

## 7.3 Default theming

```

36 %% Setup geometry ((
37 %% ))
38
39 %% Theming for hyperref and listings ((
40 \hypersetup{
41   colorlinks=true,
42   linkcolor=hsr-black,
43   citecolor=hsr-mauve,
44   filecolor=hsr-black,
45   urlcolor=hsr-blue,
46 }
47
48 %% Common listings settings
49 \lstdefinestyle{hsr-base}{
50   belowcaptionskip=\baselineskip,
51   breaklines=true,
52   frame=none,
53   inputencoding=utf8,
54   % margin
55   xleftmargin=\parindent,
56   % numbers
57   numbers=left,
58   numbersep=5pt,
59   numberstyle=\ttfamily\footnotesize\color{hsr-black40},
60   % background
61   backgroundcolor=\color{white},
62   showstringspaces=false,
63   % default language
64   language=[LaTeX]TeX,
65   % font
66   basicstyle=\ttfamily\small,
67   identifierstyle=\color{hsr-black},
68   keywordstyle=\color{hsr-blue},
69   commentstyle=\color{hsr-black40},
70   stringstyle=\color{hsr-mauve80},
71 }
72
73 %% Define missing languages / aliases
74 \lstdefinelanguage{LaTeX}{
75   language=[LaTeX]TeX
76 }
77
78 %% Set style
79 \lstset{style=hsr-base, escapechar=`}
80 %%))

```

## 7.4 Mathematics

### 7.4.1 Vectors

```

81 %% Vector ((
82 \newcommand{\hsrvecbold}[1]{\mathbf{\boldsymbol{#1}}}
83 \newcommand{\hsrvecarrow}[1]{\vv{\mathrm{#1}}} % from esvect
84
85 \newcommand{\@hsrvecf}[1]{\hsrvecbold{#1}}
86 \ifhsr@arrowvec
87   \renewcommand{\@hsrvecf}[1]{\hsrvecarrow{#1}}

```

```

88 \fi
89
90 \ifhsr@dontrenew
91   \newcommand{\vc}{\@hsrvecf}
92 \else
93   % save previous command
94   \newcommand{\vaccent}{\v}
95   \newcommand{\oldvec}{\vec}
96   % redefine
97   \renewcommand{\v}[1]{\@hsrvecf{#1}}
98   \renewcommand{\vec}[1]{\@hsrvecf{#1}}
99 \fi
100 %%)
101
102 %% Unit vector ((
103 \newcommand{\hsruvecbold}[1]{\vec{\hat{#1}}}
104 \newcommand{\hsruvecarrow}[1]{\hat{\mathrm{#1}}}
105 \newcommand{\@hsruvecf}[1]{\hsruvecbold{#1}}
106 \ifhsr@arrowvec
107   \renewcommand{\@hsruvecf}[1]{\hsruvecarrow{#1}}
108 \fi
109
110 \newcommand{\uv}[1]{\@hsruvecf{#1}}
111 \newcommand{\uvec}[1]{\@hsruvecf{#1}}
112 %%)
113
114 %% Products ((
115 \newcommand{\dotp}{\boldsymbol{\cdot}}
116 \newcommand{\crossp}{\boldsymbol{\times}}
117 \newcommand{\cross}{\crossp}
118 %%)

```

## 7.4.2 Matrices and Tensors

```

119 \newcommand{\mtx}[1]{\mathrm{#1}}
120 \newcommand{\ten}[1]{\underline{\mathbf{\boldsymbol{#1}}}}

```

## 7.4.3 Equalities

```

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

```

# 7.5 Derivatives

## 7.5.1 Differentials

```

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

```

## 7.5.2 Derivatives

```

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

```

## 7.5.3 Vector derivatives

```

126 %% Gradient ((
127 \ifhsr@textvecdiff
128   \newcommand{\grad}{\text{grad }}
129 \else
130   \newcommand{\grad}{\nabla}%
131 \fi
132 %% ))
133
134 %% Divergence ((
135 \ifhsr@textvecdiff
136   \newcommand{\@hsrdivf}{\text{div }}

```

```

137 \else
138   \newcommand{\@hsrdivf}{\nabla\cdot}
139 \fi
140 \ifhsr@dontrenew
141   \newcommand{\divg}{\@hsrdivf}
142 \else
143   \let\divsyms=\div
144   \renewcommand{\div}{\@hsrdivf}
145 \fi
146 %% ))
147
148 %% Curl ((
149 \ifhsr@textvecdiff
150   \newcommand{\curl}{\text{curl }}
151 \else
152   \newcommand{\curl}{\nabla\times}
153 \fi
154 %% ))
155
156 %% laplacian ((
157 \ifhsr@textvecdiff
158   \newcommand{\laplace}{\text{div grad }}
159 \else
160   \newcommand{\laplace}{\nabla^2}
161 \fi
162 %% ))

```

## 7.6 Colors

```

163 \definecolor{hsr-blue}{HTML}{0065A3}
164 \definecolor{hsr-blue80}{HTML}{3384B5}
165 \definecolor{hsr-blue60}{HTML}{66A3C8}
166 \definecolor{hsr-blue40}{HTML}{99C1DA}
167 \definecolor{hsr-blue20}{HTML}{CCE0ED}
168
169 \definecolor{hsr-mauve}{HTML}{6E1C50}
170 \definecolor{hsr-mauve80}{HTML}{8B4973}
171 \definecolor{hsr-mauve60}{HTML}{A87796}
172 \definecolor{hsr-mauve40}{HTML}{C5A4B9}
173 \definecolor{hsr-mauve20}{HTML}{E2D2DC}
174
175 \definecolor{hsr-lakegreen}{HTML}{548C86}
176 \definecolor{hsr-lakegreen80}{HTML}{76A39E}
177 \definecolor{hsr-lakegreen60}{HTML}{98BAB6}
178 \definecolor{hsr-lakegreen40}{HTML}{BBD1CF}
179 \definecolor{hsr-lakegreen20}{HTML}{DDE8E7}
180
181 \definecolor{hsr-reed}{HTML}{7B6951}
182 \definecolor{hsr-reed80}{HTML}{958774}
183 \definecolor{hsr-reed60}{HTML}{B0A597}
184 \definecolor{hsr-reed40}{HTML}{CAC3B9}
185 \definecolor{hsr-reed20}{HTML}{E5E1DC}
186
187 \definecolor{hsr-petrol}{HTML}{00738D}
188 \definecolor{hsr-petrol80}{HTML}{338FA4}
189 \definecolor{hsr-petrol60}{HTML}{66ABBB}
190 \definecolor{hsr-petrol40}{HTML}{99C7D1}
191 \definecolor{hsr-petrol20}{HTML}{CCE3E8}
192
193 \definecolor{hsr-basswood}{HTML}{BABD5D}
194 \definecolor{hsr-basswood80}{HTML}{C8CA7D}
195 \definecolor{hsr-basswood60}{HTML}{D6D79E}

```



```

196 \definecolor{hsr-basswood40}{HTML}{E3E5BE}
197 \definecolor{hsr-basswood20}{HTML}{F1F2DF}
198
199 \definecolor{hsr-lightgrey}{HTML}{C6C7C8}
200 \definecolor{hsr-lightgrey80}{HTML}{D1D2D3}
201 \definecolor{hsr-lightgrey60}{HTML}{DDDDDE}
202 \definecolor{hsr-lightgrey40}{HTML}{E8E8E9}
203 \definecolor{hsr-lightgrey20}{HTML}{F4F4F4}
204
205 \definecolor{hsr-black}{HTML}{1A171B}
206 \definecolor{hsr-black80}{HTML}{484549}
207 \definecolor{hsr-black60}{HTML}{767476}
208 \definecolor{hsr-black40}{HTML}{A4A2A4}
209 \definecolor{hsr-black20}{HTML}{D1D1D1}

```

## References

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

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