`hsr`stud — HSR-Stud Style and Macros*

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Released 2020/04/16

Contents

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

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 LaTeX 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.

3 Summary notation

4 Default Theming

4.1 Links with `hyperref`

Colors from [**?**] 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 §2 is enabled, the notation with a small arrow over the varible will be used $\vec{x}$, otherwise the vector is bold $\mathbf{x}$. Takes one option {⟨*letter*⟩}. \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 {⟨*letter*⟩}. 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.

$$\mathbf{u} \cdot \mathbf{v}$$

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

\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 {⟨*letter*⟩}.

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

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

\ten   Tensor notation. Takes {⟨*letter*⟩}.

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

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

5.3 Equalities

\heq   L'Hôpital limit equality symbol.

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

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

5.4 Derivatives

5.4.1 Differentials

\dd   The differential element. It needs a {⟨*var*⟩} and has the optional argument [⟨*order*⟩].

$$\mathrm{d}x \qquad \mathrm{d}^4x$$

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

\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.

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

$$= \iint \mathbf{J} \cdot \hat{\mathbf{n}} \, \mathrm{d}x \, \mathrm{d}y$$

```
1 \begin{align*}
2     I &= \int \vec{J}\dotp\dd
         {\vec{s}} \\
3       &= \iint \vec{J}\dotp\
         uvec{n}\di{x}\di{y}
4 \end{align*}
```

5.4.2 Classical

\deriv   The derivative has arguments {⟨*function*⟩}, {⟨*var*⟩} and the optional argument [⟨*order*⟩].

$$\frac{\mathrm{d}y}{\mathrm{d}x} \qquad \frac{\mathrm{d}^3 y}{\mathrm{d}x^3}$$

```
1 \[
2     \deriv{y}{x} \qquad
3     \deriv[3]{y}{x}
4 \]
```

\pderiv   The partial derivative has arguments {⟨*function*⟩}, {⟨*var*⟩} and the optional argument [⟨*order*⟩].

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

```
1 \[
2     \pderiv{y}{x} \qquad
3     \pderiv[3]{y}{x}
4 \]
```

5.4.3 Vector

\grad   The gradient operator.

$$\nabla f$$

```
1 \[ \grad f \]
```

\div   The divergence operator, \div is renamed to \divsymb.

$$\nabla \cdot f$$

```
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

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

hsrstud package implementation with inline documentation

8 Implementation

8.1 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 %% ))
```

8.2 Package options

```
17 \SetupKeyvalOptions{
18     family=hsr,
19     prefix=hsr@
20 }
21
22 %% Enable backwards-compatibility
23 \DeclareBoolOption[false]{legacy}
```

```
24
25 %% Do not renew LaTeX Macros
26 \DeclareBoolOption[false]{dontrenew}
27
28 %% Vector style
29 \DeclareBoolOption[false]{arrowvec}
30 \DeclareComplementaryOption{boldvec}{arrowvec}
31
32 %% Vector derivative style
33 \DeclareBoolOption[false]{textvecdiff}
34 \DeclareComplementaryOption{delvecdiff}{textvecdiff}
35
36
37 %% Process options
38 \ProcessLocalKeyvalOptions*
```

8.3 Summary notation

```
39 %% TODO: change letters in german
40 \newcommand{\bookref}[1]{\textttt{\textcolor{hsr-mauve}{P.#1}}}
41 \newcommand{\notesref}[1]{\textttt{\textcolor{hsr-blue}{S.#1}}}
42 \newcommand{\lectureref}[1]{\textttt{\textcolor{hsr-lakegreen}{L.#1}}}
```

8.4 Default theming

```
43 %% Theming for hyperref and listings ((
44 \hypersetup{
45     colorlinks=true,
46     linkcolor=hsr-black,
47     citecolor=hsr-mauve,
48     filecolor=hsr-black,
49     urlcolor=hsr-blue,
50 }
51
52 %% Common listings settings
53 \lstdefinestyle{hsr-base}{
54     belowcaptionskip=\baselineskip,
55     breaklines=true,
56     frame=none,
57     inputencoding=utf8,
58     % margin
59     xleftmargin=\parindent,
60     % numbers
61     numbers=left,
62     numbersep=5pt,
63     numberstyle=\ttfamily\footnotesize\color{hsr-black40},
64     % background
65     backgroundcolor=\color{white},
66     showstringspaces=false,
67     % default language
68     language=[LaTeX]TeX,
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 %%))
```

8.5 Mathematics

8.5.1 Vectors

```
85 %% Vector ((
86 \newcommand{\hsrvecbold}[1]{\mathbf{\boldsymbol{#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 \ifhsr@dontrenew
95     \newcommand{\vc}{\@hsrvecf}
96 \else
97     % save previous command
98     \newcommand{\vaccent}{\v}
99     \newcommand{\oldvec}{\vec}
100    % redefine
101    \renewcommand{\v}[1]{\@hsrvecf{#1}}
102    \renewcommand{\vec}[1]{\@hsrvecf{#1}}
103 \fi
104 %%))
105
106 %% Unit vector ((
107 \newcommand{\hsruvecbold}[1]{\vec{\hat{#1}}}
108 \newcommand{\hsruvecarrow}[1]{\hat{\mathrm{#1}}}
109 \newcommand{\@hsruvecf}[1]{\hsruvecbold{#1}}
110 \ifhsr@arrowvec
111     \renewcommand{\@hsruvecf}[1]{\hsruvecarrow{#1}}
112 \fi
113
114 \newcommand{\uv}[1]{\@hsruvecf{#1}}
115 \newcommand{\uvec}[1]{\@hsruvecf{#1}}
116 %%))
117
118 %% Products ((
119 \newcommand{\dotp}{\boldsymbol\cdot}
120 \newcommand{\crossp}{\boldsymbol\times}
121 \newcommand{\cross}{\crossp}
122 %%))
```

8.5.2 Matrices and Tensors

```
123 \newcommand{\mtx}[1]{\mathrm{#1}}
124 \newcommand{\ten}[1]{\underline{\mathbf{\boldsymbol{#1}}}}
```

8.5.3 Equalities

```
125 \newcommand{\heq}{\stackrel{\hat{\texttt{H}}}{=}}
```

8.6 Derivatives

8.6.1 Differentials

```
126 \newcommand{\dd}[2][]{\mathrm{d}^{#1} #2}
127 \newcommand{\di}[2][]{\,\dd[#1]{#2}}
```

8.6.2 Derivatives

```
128 \newcommand{\deriv}[3][]{\frac{\dd[#1]{#2}}{\dd[]{#3^{#1}}}}
129 \newcommand{\pderiv}[3][]{\frac{\partial^{#1} #2}{\partial #3^{#1}}}
```

8.6.3 Vector derivatives

```
130 %% Gradient ((
131 \ifhsr@textvecdiff
132     \newcommand{\grad}{\text{grad }}
133 \else
134     \newcommand{\grad}{\nabla}%
135 \fi
136 %% ))
137
138 %% Divergence ((
139 \ifhsr@textvecdiff
140     \newcommand{\@hsrdivf}{\text{div }}
141 \else
142     \newcommand{\@hsrdivf}{\nabla\cdot}
143 \fi
144 \ifhsr@dontrenew
145     \newcommand{\divg}{\@hsrdivf}
146 \else
147     \let\divsymb=\div
148     \renewcommand{\div}{\@hsrdivf}
149 \fi
150 %% ))
151
152 %% Curl ((
153 \ifhsr@textvecdiff
154     \newcommand{\curl}{\text{curl }}
155 \else
156     \newcommand{\curl}{\nabla\times}
157 \fi
158 %% ))
159
160 %% laplacian ((
161 \ifhsr@textvecdiff
162     \newcommand{\laplace}{\text{div grad }}
163 \else
164     \newcommand{\laplace}{\nabla^2}
165 \fi
166 %% ))
```

8.7 Colors

```
167 \definecolor{hsr-blue}{HTML}{0065A3}
168 \definecolor{hsr-blue80}{HTML}{3384B5}
169 \definecolor{hsr-blue60}{HTML}{66A3C8}
170 \definecolor{hsr-blue40}{HTML}{99C1DA}
171 \definecolor{hsr-blue20}{HTML}{CCE0ED}
172
173 \definecolor{hsr-mauve}{HTML}{6E1C50}
174 \definecolor{hsr-mauve80}{HTML}{8B4973}
175 \definecolor{hsr-mauve60}{HTML}{A87796}
176 \definecolor{hsr-mauve40}{HTML}{C5A4B9}
177 \definecolor{hsr-mauve20}{HTML}{E2D2DC}
178
179 \definecolor{hsr-lakegreen}{HTML}{548C86}
180 \definecolor{hsr-lakegreen80}{HTML}{76A39E}
181 \definecolor{hsr-lakegreen60}{HTML}{98BAB6}
182 \definecolor{hsr-lakegreen40}{HTML}{BBD1CF}
183 \definecolor{hsr-lakegreen20}{HTML}{DDE8E7}
184
```

```
185 \definecolor{hsr-reed}{HTML}{7B6951}
186 \definecolor{hsr-reed80}{HTML}{958774}
187 \definecolor{hsr-reed60}{HTML}{B0A597}
188 \definecolor{hsr-reed40}{HTML}{CAC3B9}
189 \definecolor{hsr-reed20}{HTML}{E5E1DC}
190
191 \definecolor{hsr-petrol}{HTML}{00738D}
192 \definecolor{hsr-petrol80}{HTML}{338FA4}
193 \definecolor{hsr-petrol60}{HTML}{66ABBB}
194 \definecolor{hsr-petrol40}{HTML}{99C7D1}
195 \definecolor{hsr-petrol20}{HTML}{CCE3E8}
196
197 \definecolor{hsr-basswood}{HTML}{BABD5D}
198 \definecolor{hsr-basswood80}{HTML}{C8CA7D}
199 \definecolor{hsr-basswood60}{HTML}{D6D79E}
200 \definecolor{hsr-basswood40}{HTML}{E3E5BE}
201 \definecolor{hsr-basswood20}{HTML}{F1F2DF}
202
203 \definecolor{hsr-lightgrey}{HTML}{C6C7C8}
204 \definecolor{hsr-lightgrey80}{HTML}{D1D2D3}
205 \definecolor{hsr-lightgrey60}{HTML}{DDDDDE}
206 \definecolor{hsr-lightgrey40}{HTML}{E8E8E9}
207 \definecolor{hsr-lightgrey20}{HTML}{F4F4F4}
208
209 \definecolor{hsr-black}{HTML}{1A171B}
210 \definecolor{hsr-black80}{HTML}{484549}
211 \definecolor{hsr-black60}{HTML}{767476}
212 \definecolor{hsr-black40}{HTML}{A4A2A4}
213 \definecolor{hsr-black20}{HTML}{D1D1D1}
```

9   Legacy code

```
214 \ifhsr@legacy
215 %% Makros für Titel, Autor und Datum ((
216 %% Dank diesem Makro stehen Titel, Autor und Datum überall im Dokument zur verfügung
217 %% Date hat zudem den Default-Wert \today
218 \def\@Title{}
219 \def\@Author{}
220 \def\@Date{\today}
221 \newcommand{\Title}{\@Title}
222 \newcommand{\Author}{\@Author}
223 \newcommand{\Date}{\@Date}
224 \AtBeginDocument{%
225   \let\@Title\@title
226   \let\@Author\@author
227   \let\@Date\@date
228 }
229 %% ))
230
231 %% Makros für den Arraystretch  ((
232 %% bei uns meist in Tabellen genutzt, welche Formeln enthalten
233
234 %% Default Value
235 \def\@ArrayStretchDefault{1} % Entspricht der Voreinstellung von Latex
236
237 %% Setzt einen neuen Wert für den arraystretch
238 \newcommand{\setArrayStretch}[1]{\renewcommand{\arraystretch}{#1}}
239
240 %% Setzt den arraystretch zurück auf den default wert
241 \newcommand{\resetArrayStretch}{\renewcommand{\arraystretch}{\@ArrayStretchDefault}}
242
```

```latex
243 %% Makro zum setzten des Default arraystretch.
244 %% Kann nur in der Präambel verwendet werden.
245 \newcommand{\setDefaultArrayStretch}[1]{%
246 \AtBeginDocument{%
247 \def\@ArrayStretchDefault{#1}
248 \renewcommand{\arraystretch}{#1}
249 }
250 }
251 %% ))
252
253 %% Command for images in table
254 \newcommand\tabImg[2][]{%
255     \raisebox{0pt}[\dimexpr\totalheight+\dp\strutbox\relax][\dp\strutbox]{%
256         \includegraphics[#1]{#2}%
257     }%
258 }
259
260 %% Makros für Verweise auf ein Buch oder Skript ((
261 \newcommand{\buch}[1]{\texorpdfstring{$_{\textcolor{HSRLakeGreen}{\mbox{\small{#1}}}}$}{}}
262 \newcommand{\buchSeite}[1]{\texorpdfstring{\ensuremath{_{\textcolor{red}{\mbox{\small{ S#1}}}}}}{}}
263 \newcommand{\skript}[1]{\texorpdfstring{$_{\textcolor{HSRReed}{\mbox{\small{#1}}}}$}{}}
264 \newcommand{\formelbuch}[1]{$_{\textcolor{red}{\mbox{\small{S#1}}}}$}
265 %% ))
266
267 \setlength{\parindent}{0pt}
268
269 %% Todo command
270 \newcommand{\todo}[1]{\textbf{\color{red}{TO DO: #1}}}
271
272 %% Color names ((
273 \colorlet{HSRWhite}{white}
274
275 \colorlet{HSRBlue}{hsr-blue}
276 \colorlet{HSRBlue80}{hsr-blue80}
277 \colorlet{HSRBlue60}{hsr-blue60}
278 \colorlet{HSRBlue40}{hsr-blue40}
279 \colorlet{HSRBlue20}{hsr-blue20}
280
281 \colorlet{HSRLightGray}{hsr-lightgrey}
282 \colorlet{HSRLightGray80}{hsr-lightgrey80}
283 \colorlet{HSRLightGray60}{hsr-lightgrey60}
284 \colorlet{HSRLightGray40}{hsr-lightgrey40}
285 \colorlet{HSRLightGray20}{hsr-lightgrey20}
286
287 \colorlet{HSRSchwarz}{hsr-black}
288 \colorlet{HSRSchwarz80}{hsr-black80}
289 \colorlet{HSRSchwarz60}{hsr-black60}
290 \colorlet{HSRSchwarz40}{hsr-black40}
291 \colorlet{HSRSchwarz20}{hsr-black20}
292
293 \colorlet{HSRHematite}{hsr-mauve}
294 \colorlet{HSRHematite80}{hsr-mauve80}
295 \colorlet{HSRHematite60}{hsr-mauve60}
296 \colorlet{HSRHematite40}{hsr-mauve40}
297 \colorlet{HSRHematite20}{hsr-mauve20}
298
299 \colorlet{HSRLakeGreen}{hsr-lakegreen}
300 \colorlet{HSRLakeGreen80}{hsr-lakegreen80}
301 \colorlet{HSRLakeGreen60}{hsr-lakegreen60}
302 \colorlet{HSRLakeGreen40}{hsr-lakegreen40}
303 \colorlet{HSRLakeGreen20}{hsr-lakegreen20}
```

```
304
305 \colorlet{HSRReed}{hsr-reed}
306 \colorlet{HSRReed80}{hsr-reed80}
307 \colorlet{HSRReed60}{hsr-reed60}
308 \colorlet{HSRReed40}{hsr-reed40}
309 \colorlet{HSRReed20}{hsr-reed20}
310
311 \colorlet{HSRPetrol}{hsr-petrol}
312 \colorlet{HSRPetrol80}{hsr-petrol80}
313 \colorlet{HSRPetrol60}{hsr-petrol60}
314 \colorlet{HSRPetrol40}{hsr-petrol40}
315 \colorlet{HSRPetrol20}{hsr-petrol20}
316
317 \colorlet{HSRBasswood}{hsr-basswood}
318 \colorlet{HSRBasswood80}{hsr-basswood80}
319 \colorlet{HSRBasswood60}{hsr-basswood60}
320 \colorlet{HSRBasswood40}{hsr-basswood40}
321 \colorlet{HSRBasswood20}{hsr-basswood20}
322 %% ))
323
324 \fi %% ifhsr@legacy
```