hsrstud — HSR-Stud Style and Macros*

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Contents

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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*⟩}.

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

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

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

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

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

5.3 Equalities

\heq L'Hôpital limit equality symbol.

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

```
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*⟩].

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

```
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.

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

```
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.

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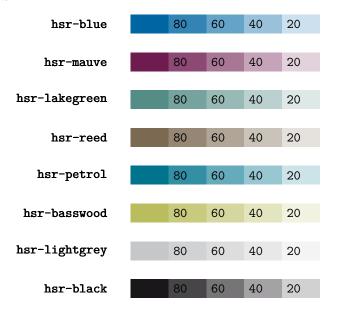
```
1 \[ \div f \]
```

\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 %% 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*
```

8.3 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}}}
```

8.4 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     % font
67     basicstyle=\ttfamily\small,
68     identifierstyle=\color{hsr-black},
69     keywordstyle=\color{hsr-blue},
70     commentstyle=\color{hsr-black40},
71     stringstyle=\color{hsr-mauve80},
72 }
73
74 %% Define missing languages / aliases
75 \lstdefinelanguage{LaTeX}{
76     language=[LaTeX]Tex
77 }
78
79 %% Set style
80 \lstset{style=hsr-base, escapechar=`}
```

```
81 %%))
```

8.5 Mathematics

8.5.1 Vectors

```
82 %% Vector ((
83 \newcommand{\hsrvecbold}[1]{\mathbf{\boldsymbol{#1}}}
84 \newcommand{\hsrvecarrow}[1]{\vv{\mathrm{#1}}} % from esvect
85
86 \newcommand{\@hsrvecf}[1]{\hsrvecbold{#1}}
87 \ifhsr@arrowvec
88     \renewcommand{\@hsrvecf}[1]{\hsrvecarrow{#1}}
89 \fi
90
91 \ifhsr@dontrenew
92     \newcommand{\vc}{\@hsrvecf}
93 \else
94     % save previous command
95     \newcommand{\vaccent}{\v}
96     \newcommand{\oldvec}{\vec}
97     % redefine
98     \renewcommand{\v}[1]{\@hsrvecf{#1}}
99     \renewcommand{\vec}[1]{\@hsrvecf{#1}}
100 \fi
101 %%))
102
103 %% Unit vector ((
104 \newcommand{\hsruvecbold}[1]{\vec{\hat{#1}}}
105 \newcommand{\hsruvecarrow}[1]{\hat{\mathrm{#1}}}
106 \newcommand{\@hsruvecf}[1]{\hsruvecbold{#1}}
107 \ifhsr@arrowvec
108     \renewcommand{\@hsruvecf}[1]{\hsruvecarrow{#1}}
109 \fi
110
111 \newcommand{\uv}[1]{\@hsruvecf{#1}}
112 \newcommand{\uvec}[1]{\@hsruvecf{#1}}
113 %%))
114
115 %% Products ((
116 \newcommand{\dotp}{\boldsymbol\cdot}
117 \newcommand{\crossp}{\boldsymbol\times}
118 \newcommand{\cross}{\crossp}
119 %%))
```

8.5.2 Matrices and Tensors

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

8.5.3 Equalities

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

8.6 Derivatives

8.6.1 Differentials

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

8.6.2 Derivatives

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

8.6.3 Vector derivatives

```
127 %% Gradient ((
128 \ifhsr@textvecdiff
129     \newcommand{\grad}{\text{grad }}
130 \else
131     \newcommand{\grad}{\nabla}%
132 \fi
133 %% ))
134
135 %% Divergence ((
136 \ifhsr@textvecdiff
137     \newcommand{\@hsrdivf}{\text{div }}
138 \else
139     \newcommand{\@hsrdivf}{\nabla\cdot}
140 \fi
141 \ifhsr@dontrenew
142     \newcommand{\divg}{\@hsrdivf}
143 \else
144     \let\divsymb=\div
145     \renewcommand{\div}{\@hsrdivf}
146 \fi
147 %% ))
148
149 %% Curl ((
150 \ifhsr@textvecdiff
151     \newcommand{\curl}{\text{curl }}
152 \else
153     \newcommand{\curl}{\nabla\times}
154 \fi
155 %% ))
156
157 %% laplacian ((
158 \ifhsr@textvecdiff
159     \newcommand{\laplace}{\text{div grad }}
160 \else
161     \newcommand{\laplace}{\nabla^2}
162 \fi
163 %% ))
```

8.7 Colors

```
164 \definecolor{hsr-blue}{HTML}{0065A3}
165 \definecolor{hsr-blue80}{HTML}{3384B5}
166 \definecolor{hsr-blue60}{HTML}{66A3C8}
167 \definecolor{hsr-blue40}{HTML}{99C1DA}
168 \definecolor{hsr-blue20}{HTML}{CCE0ED}
169
170 \definecolor{hsr-mauve}{HTML}{6E1C50}
171 \definecolor{hsr-mauve80}{HTML}{8B4973}
172 \definecolor{hsr-mauve60}{HTML}{A87796}
173 \definecolor{hsr-mauve40}{HTML}{C5A4B9}
174 \definecolor{hsr-mauve20}{HTML}{E2D2DC}
175
176 \definecolor{hsr-lakegreen}{HTML}{548C86}
177 \definecolor{hsr-lakegreen80}{HTML}{76A39E}
178 \definecolor{hsr-lakegreen60}{HTML}{98BAB6}
179 \definecolor{hsr-lakegreen40}{HTML}{BBD1CF}
180 \definecolor{hsr-lakegreen20}{HTML}{DDE8E7}
181
182 \definecolor{hsr-reed}{HTML}{7B6951}
183 \definecolor{hsr-reed80}{HTML}{958774}
```

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