hsrstud — HSR-Stud Style and Macros*

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Contents

*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.

$$\hat{\mathbf{x}} = \mathbf{x}/x$$

```
\[ \uvec{x} = \vec{x}/x \]
```

5.1.1 Products

`\dotp` Dot product between vectors.

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

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

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

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

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

5.2 Matrices and Tensors

`\mtx` Matrix notation. Takes `{`⟨*letter*⟩`}`.

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

```
\[
    \mtx{J} = \begin{pmatrix}
                0 & 1 \\
                1 & 0
              \end{pmatrix}
\]
```

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

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

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

5.3 Equalities

`\heq` L'Hôpital limit equality symbol.

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

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

5.4 Derivatives

5.4.1 Differentials

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

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

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

`\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.

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

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

5.4.2 Classical

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

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

```
\[
    \deriv{y}{x} \qquad
    \deriv[3]{y}{x}
\]
```

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

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

```
\[
    \pderiv{y}{x} \qquad
    \pderiv[3]{y}{x}
\]
```

5.4.3 Vector

`\grad` The gradient operator.

$$\nabla f$$

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

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

$$\nabla \cdot f$$

```
\[ \div f \]
```

`\curl` The curl operator.

$$\nabla \times f$$

```
\[ \curl f \]
```

`\laplace` The laplace operator.

$$\nabla^2 f$$

```
\[ \laplace f \]
```

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

```
%% Dependencies ((
\RequirePackage{amsmath}
\RequirePackage{amssymb}
\RequirePackage{bm}

\RequirePackage{esint}
\PassOptionsToPackage{b}{esvect}
\RequirePackage{esvect}

\RequirePackage{xcolor}
\RequirePackage{hyperref}
\RequirePackage{listings}

\RequirePackage{iftex}
\RequirePackage{kvoptions}
%% ))
```

8.2 Package options

```
\SetupKeyvalOptions{
    family=hsr,
    prefix=hsr@
}

%% Do not renew LaTeX Macros
\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=`}
```

```
%%))
```

8.5 Mathematics

8.5.1 Vectors

```
%% Vector ((
\newcommand{\hsrvecbold}[1]{\mathbf{\boldsymbol{#1}}}
\newcommand{\hsrvecarrow}[1]{\vv{\mathrm{#1}}} % from esvect

\newcommand{\@hsrvecf}[1]{\hsrvecbold{#1}}
\ifhsr@arrowvec
    \renewcommand{\@hsrvecf}[1]{\hsrvecarrow{#1}}
\fi

\ifhsr@dontrenew
    \newcommand{\vc}{\@hsrvecf}
\else
    % save previous command
    \newcommand{\vaccent}{\v}
    \newcommand{\oldvec}{\vec}
    % redefine
    \renewcommand{\v}[1]{\@hsrvecf{#1}}
    \renewcommand{\vec}[1]{\@hsrvecf{#1}}
\fi
%%))

%% Unit vector ((
\newcommand{\hsruvecbold}[1]{\vec{\hat{#1}}}
\newcommand{\hsruvecarrow}[1]{\hat{\mathrm{#1}}}
\newcommand{\@hsruvecf}[1]{\hsruvecbold{#1}}
\ifhsr@arrowvec
    \renewcommand{\@hsruvecf}[1]{\hsruvecarrow{#1}}
\fi

\newcommand{\uv}[1]{\@hsruvecf{#1}}
\newcommand{\uvec}[1]{\@hsruvecf{#1}}
%%))

%% Products ((
\newcommand{\dotp}{\boldsymbol\cdot}
\newcommand{\crossp}{\boldsymbol\times}
\newcommand{\cross}{\crossp}
%%))
```

8.5.2 Matrices and Tensors

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

8.5.3 Equalities

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

8.6 Derivatives

8.6.1 Differentials

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

8.6.2 Derivatives

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

8.6.3 Vector derivatives

```
%% Gradient ((
\ifhsr@textvecdiff
    \newcommand{\grad}{\text{grad }}
\else
    \newcommand{\grad}{\nabla}%
\fi
%% ))

%% Divergence ((
\ifhsr@textvecdiff
    \newcommand{\@hsrdivf}{\text{div }}
\else
    \newcommand{\@hsrdivf}{\nabla\cdot}
\fi
\ifhsr@dontrenew
    \newcommand{\divg}{\@hsrdivf}
\else
    \let\divsymb=\div
    \renewcommand{\div}{\@hsrdivf}
\fi
%% ))

%% Curl ((
\ifhsr@textvecdiff
    \newcommand{\curl}{\text{curl }}
\else
    \newcommand{\curl}{\nabla\times}
\fi
%% ))

%% laplacian ((
\ifhsr@textvecdiff
    \newcommand{\laplace}{\text{div grad }}
\else
    \newcommand{\laplace}{\nabla^2}
\fi
%% ))
```

8.7 Colors

```
\definecolor{hsr-blue}{HTML}{0065A3}
\definecolor{hsr-blue80}{HTML}{3384B5}
\definecolor{hsr-blue60}{HTML}{66A3C8}
\definecolor{hsr-blue40}{HTML}{99C1DA}
\definecolor{hsr-blue20}{HTML}{CCE0ED}

\definecolor{hsr-mauve}{HTML}{6E1C50}
\definecolor{hsr-mauve80}{HTML}{8B4973}
\definecolor{hsr-mauve60}{HTML}{A87796}
\definecolor{hsr-mauve40}{HTML}{C5A4B9}
\definecolor{hsr-mauve20}{HTML}{E2D2DC}

\definecolor{hsr-lakegreen}{HTML}{548C86}
\definecolor{hsr-lakegreen80}{HTML}{76A39E}
\definecolor{hsr-lakegreen60}{HTML}{98BAB6}
\definecolor{hsr-lakegreen40}{HTML}{BBD1CF}
\definecolor{hsr-lakegreen20}{HTML}{DDE8E7}

\definecolor{hsr-reed}{HTML}{7B6951}
\definecolor{hsr-reed80}{HTML}{958774}
```

```
\definecolor{hsr-reed60}{HTML}{B0A597}
\definecolor{hsr-reed40}{HTML}{CAC3B9}
\definecolor{hsr-reed20}{HTML}{E5E1DC}

\definecolor{hsr-petrol}{HTML}{00738D}
\definecolor{hsr-petrol80}{HTML}{338FA4}
\definecolor{hsr-petrol60}{HTML}{66ABBB}
\definecolor{hsr-petrol40}{HTML}{99C7D1}
\definecolor{hsr-petrol20}{HTML}{CCE3E8}

\definecolor{hsr-basswood}{HTML}{BABD5D}
\definecolor{hsr-basswood80}{HTML}{C8CA7D}
\definecolor{hsr-basswood60}{HTML}{D6D79E}
\definecolor{hsr-basswood40}{HTML}{E3E5BE}
\definecolor{hsr-basswood20}{HTML}{F1F2DF}

\definecolor{hsr-lightgrey}{HTML}{C6C7C8}
\definecolor{hsr-lightgrey80}{HTML}{D1D2D3}
\definecolor{hsr-lightgrey60}{HTML}{DDDDDE}
\definecolor{hsr-lightgrey40}{HTML}{E8E8E9}
\definecolor{hsr-lightgrey20}{HTML}{F4F4F4}

\definecolor{hsr-black}{HTML}{1A171B}
\definecolor{hsr-black80}{HTML}{484549}
\definecolor{hsr-black60}{HTML}{767476}
\definecolor{hsr-black40}{HTML}{A4A2A4}
\definecolor{hsr-black20}{HTML}{D1D1D1}
```