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

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Contents

1 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 be replaced with grad, div, curl and div grad.

```
1 \newif\if@arrowvec\@arrowvecfalse
2 \DeclareOption{arrowvec}{\@arrowvectrue}
3
4 \newif\if@textvecdiff\@textvecdifffalse
5 \DeclareOption{textvecdiff}{\@textvecdifftrue}
6
7 \ProcessOptions\relax
```

2 Mathematics

2.1 Formatting

\vec Vectors notation. If the option `arrowvec` described in §1 is enabled, the notation with a small arrow over the varible will be used, else the vector is bold. Takes one option {⟨*letter*⟩}.

---

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

$$\mathbf{F} = m\mathbf{a}$$

```
\vec{F} = m\vec{a}
```

```
 8 \if@arrowvec
 9 \else
10 \renewcommand{\vec}[1]{\mathbf{\boldsymbol#1}}
11 \fi
```

\uvec Unit vector notation. Takes {⟨*letter*⟩}.

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

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

```
12 \newcommand{\uvec}[1]{\mathrm{\vec{\hat{#1}}}}
```

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

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

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

```
13 \newcommand{\mtx}[1]{\mathrm{#1}}
```

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

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

```
\vec{T}^{(\vec{n})} =
    \uvec{n}\cdot\ten{\sigma}
```

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

2.2 Equalities

\heq L'Hôpital limit equality symbol.

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

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

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

2.3 Derivatives

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

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

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

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

\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.

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

```
% no spacing needed (because of cdot)
I = \int\vec{J}\cdot\di{\vec{s}}
% needs spacing
  = \iint\vec{J}\cdot\uvec{n}\di{x}\di{y}
```

17 `\newcommand{\di}[2][]{\,\dd[#1]{#2}}`

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

$$\frac{\mathrm{d}y}{\mathrm{d}x} \qquad \frac{\mathrm{d}^3 y}{\mathrm{d}x^3}$$
`\deriv{y}{x}`
`\deriv[3]{y}{x}`

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

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

$$\frac{\partial y}{\partial x} \qquad \frac{\partial^2 y}{\partial x^2}$$
`\deriv{f}{x}`
`\deriv[2]{f}{x}`

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

`\grad` The gradient operator.

$$\nabla f \qquad\qquad$$ `\grad f`

20 `\if@textvecdiff`
21   `\newcommand{\grad}{\text{grad }}`
22 `\else`
23   `\newcommand{\grad}{\nabla}%`
24 `\fi`

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

$$\nabla \cdot f \qquad\qquad$$ `\div f`

25 `\let\divsymb=\div`
26 `\if@textvecdiff`
27   `\renewcommand{\div}{\text{div}}`
28 `\else`
29   `\renewcommand{\div}{\nabla\cdot}`
30 `\fi`

`\curl` The curl operator.

$$\nabla \times f \qquad\qquad$$ `\curl f`

31 `\if@textvecdiff`
32   `\newcommand{\curl}{\text{curl }}`
33 `\else`
34   `\newcommand{\curl}{\nabla\times}`
35 `\fi`

`\laplace` The laplace operator.

$$\nabla^2 f \qquad\qquad$$ `\laplace f`

36 `\if@textvecdiff`
37   `\newcommand{\laplace}{\text{div grad}}`
38 `\else`
39   `\newcommand{\laplace}{\nabla^2}`
40 `\fi`

3 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

```
41 \definecolor{hsr-blue}{HTML}{0065A3}
42 \definecolor{hsr-blue80}{HTML}{3384B5}
43 \definecolor{hsr-blue60}{HTML}{66A3C8}
44 \definecolor{hsr-blue40}{HTML}{99C1DA}
45 \definecolor{hsr-blue20}{HTML}{CCE0ED}
46
47 \definecolor{hsr-mauve}{HTML}{6E1C50}
48 \definecolor{hsr-mauve80}{HTML}{8B4973}
49 \definecolor{hsr-mauve60}{HTML}{A87796}
50 \definecolor{hsr-mauve40}{HTML}{C5A4B9}
51 \definecolor{hsr-mauve20}{HTML}{E2D2DC}
52
53 \definecolor{hsr-lakegreen}{HTML}{548C86}
54 \definecolor{hsr-lakegreen80}{HTML}{76A39E}
55 \definecolor{hsr-lakegreen60}{HTML}{98BAB6}
56 \definecolor{hsr-lakegreen40}{HTML}{BBD1CF}
57 \definecolor{hsr-lakegreen20}{HTML}{DDE8E7}
58
59 \definecolor{hsr-reed}{HTML}{7B6951}
60 \definecolor{hsr-reed80}{HTML}{958774}
61 \definecolor{hsr-reed60}{HTML}{B0A597}
62 \definecolor{hsr-reed40}{HTML}{CAC3B9}
63 \definecolor{hsr-reed20}{HTML}{E5E1DC}
64
65 \definecolor{hsr-petrol}{HTML}{00738D}
66 \definecolor{hsr-petrol80}{HTML}{338FA4}
67 \definecolor{hsr-petrol60}{HTML}{66ABBB}
68 \definecolor{hsr-petrol40}{HTML}{99C7D1}
69 \definecolor{hsr-petrol20}{HTML}{CCE3E8}
70
71 \definecolor{hsr-basswood}{HTML}{BABD5D}
72 \definecolor{hsr-basswood80}{HTML}{C8CA7D}
```

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4   Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

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