

stmmath package description

Copyright © 2023 DLR FA STM
v20230211

Martin Rädcl

2023-02-11

These are the math definitions for `stmlatex`. It is build upon the [amsmath](#) package.

Contents

1. Commands	1
1.1. Operators	1
1.2. Symbols	1
2. Commands	1
3. Environments	2
A. The code	3
A.1. <code>stmmath.sty</code>	3
A.2. <code>stmmathbase.sty</code>	4
A.3. <code>stmmathitems.sty</code>	6

1. Commands

1.1. Operators

<code>\dev</code>	Deviatoric	<code>dev</code>
<code>\dif</code>	Infinitesimal differential	<code>d</code>
<code>\divergenceoperator</code>	Quantity of a vector field	<code>div</code>
<code>\erf</code>	Error function	<code>erf</code>
<code>\sign</code>	Signum function	<code>sign</code>
<code>\sph</code>	Spherical	<code>sph</code>
<code>\spur</code>	Trace	<code>Tr</code>
<code>\Grad</code>	Gradient w.r.t. material coordinates	<code>Grad</code>
<code>\grad</code>	Gradient w.r.t. spatial coordinates	<code>grad</code>

1.2. Symbols

`\minus`
`\curveplus`
`\rightplus`
`\upplus`

–
↪+
→+
↑+

2. Commands

There are additional commands available which require parameters. They are defined dependent of the symbols used in `stmglossaries`.

3. Environments

A. The code

A.1. stmmath.sty

```
1 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
2 % Header %
3 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
4 %
5 % This is a interface to all stm math definitions
6 % Based upon the amsmath package:
7 %   https://ctan.org/pkg/amsmath
8 %
9 % Usage
10 % - Preamble:
11 %   - \usepackage{stmmath}
12 %
13 % Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
14 %               Initial draft
15 %
16 % Contact:   Martin Raedel, martin.raedel@dlr.de
17 %               DLR Composite Structures and Adaptive Systems
18 %
19 %               _ _/|_ _
20 %               / _/_/_/_/
21 %               www.dlr.de/fa/en   | / DLR
22 %
23 % Copyright (C) 2019-... DLR Composite Structures and Adaptive Systems
24 %
25 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
26 % Content %
27 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
28
29 % Declare that this style file requires at least LaTeX version 2e.
30 \NeedsTeXFormat{LaTeX2e}
31
32 % Provide the name of your page, the date it was last updated, and a
33 %   comment about what it's used for
34
35 \ProvidesPackage{stmmath}[2019/10/27 STMs custom LaTeX math definitions]
36
37 % -----
38 % Options
39 % -----
40
41 % For options
```

```

40 \@ifpackageloaded{kvoptions}{\RequirePackage{kvoptions}}%
41
42 % Option group
43 \SetupKeyvalOptions{%
44   family=stmmath,%
45   prefix=stmmath@,%
46   setkeys=\kvsetkeys,%
47 }
48
49 % Items
50 \DeclareBoolOption[true]{items}
51
52 % Process options
53 \ProcessKeyvalOptions{stmmath}
54
55 % -----
56 % Modules
57 % -----
58
59 % Load the base package
60 \@ifpackageloaded{stmmathbase}{\RequirePackage{stmmathbase}}%
61
62 }%
63
64 % Load the items
65 \ifstmmath@items
66   \@ifpackageloaded{stmmathitems}{\RequirePackage{stmmathitems}}%
67
68 }%
69 \fi
70
71 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
72 % That's it %
73 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
74
75 % Finally, we'll use \endinput to indicate that LaTeX can stop reading
76 % this file. LaTeX will ignore anything after this line.
77 \endinput

```

A.2. stmmathbase.sty

```

1 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
2 % Header %
3 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

```

```

4 %
5 % This is a interface to all stm math definitions
6 % Based upon the amsmath package:
7 %   https://ctan.org/pkg/amsmath
8 %
9 % Usage
10 %   - Preamble:
11 %     - \usepackage{stmmathbase}
12 %
13 % Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
14 %               Initial draft
15 %
16 % Contact:   Martin Raedel, martin.raedel@dlr.de
17 %             DLR Composite Structures and Adaptive Systems
18 %
19 %               __/|__
20 %               /_/_/_/
21 %             www.dlr.de/fa/en   | / DLR
22 %
23 % Copyright (C) 2019-... DLR Composite Structures and Adaptive Systems
24 %
25 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
26 % Content %
27 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
28 %
29 % Declare that this style file requires at least LaTeX version 2e.
30 \NeedsTeXFormat{LaTeX2e}
31
32 % Provide the name of your page, the date it was last updated, and a
33 %   comment about what it's used for
34 \ProvidesPackage{stmmathbase}[2019/10/27 STMs custom LaTeX math
35 %   definitions]
36
37 % -----
38 % Package
39 % -----
40
41 % Load amsmath to defined math operators
42 \@ifpackageloaded{amsmath}{}{\RequirePackage{amsmath}}%
43 \@ifpackageloaded{amssymb}{}{\RequirePackage{amssymb}}%
44
45 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
46 % That's it %
47 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

```

```

46
47 % Finally, we'll use \endinput to indicate that LaTeX can stop reading
    this file. LaTeX will ignore anything after this line.
48 \endinput

```

A.3. stmmathitems.sty

```

1 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
2 % Header %
3 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
4 %
5 % This is a interface to all stm math definitions
6 % Based upon the amsmath package:
7 %   https://ctan.org/pkg/amsmath
8 %
9 % Usage
10 % - Preamble:
11 %   - \usepackage{stmmathitems}
12 %
13 % Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
14 %               Initial draft
15 %
16 % Contact:   Martin Raedel, martin.raedel@dlr.de
17 %               DLR Composite Structures and Adaptive Systems
18 %
19 %               _ _/_/_
20 %               /_/_/_/_
21 %               www.dlr.de/fa/en   | / DLR
22 %
23 % Copyright (C) 2019-... DLR Composite Structures and Adaptive Systems
24 %
25 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
26 % Content %
27 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
28
29 % Declare that this style file requires at least LaTeX version 2e.
30 \NeedsTeXFormat{LaTeX2e}
31
32 % Provide the name of your page, the date it was last updated, and a
    comment about what it's used for
33 \ProvidesPackage{stmmathitems}[2019/10/27 STMs custom LaTeX math
    definitions]
34
35 % -----

```

```

36 % Package
37 % -----
38
39 % Load base package
40 \@ifpackageloaded{stmmathbase}{\RequirePackage{stmmathbase}}%
41
42 % -----
43 % Modules
44 % -----
45
46 % Operators
47 \@ifundefined{dev}{\DeclareMathOperator{\dev}{dev}}{}
48 \@ifundefined{divergenceoperator}{\DeclareMathOperator{\divergenceoperator}{div}}{}
49 \@ifundefined{erf}{\DeclareMathOperator{\erf}{erf}}{}
50 \@ifundefined{sign}{\DeclareMathOperator{\sign}{sign}}{}
51 \@ifundefined{sph}{\DeclareMathOperator{\sph}{sph}}{}
52 \@ifundefined{spur}{\DeclareMathOperator{\spur}{Tr}}{}
53 \@ifundefined{Grad}{\DeclareMathOperator{\Grad}{Grad}}{}% englisch
    gradient w.r.t material coordinates
54 \@ifundefined{grad}{\DeclareMathOperator{\grad}{grad}}{}% englisch
    gradient w.r.t spatial coordinates
55
56 % -----
57 % Symbols
58 % -----
59
60 % Upright dif-symbol
61 \@ifundefined{dif}{\newcommand*\dif{\mathop{\!}\!\mathrm{d}}}{}}
62
63 % shorter minus sign
64 \@ifpackageloaded{graphicx}{\RequirePackage{graphicx}}%
65 \@ifundefined{minus}{\newcommand{\minus}{\scalebox{0.75}[1.0]{\$-\$}}}{}}
66
67 % Symbols for static equilibrium conditions:
68 \newcommand*\curveplus{%
69   \mathbin{\rotatebox[origin=c]{90}{\mathchar"201E\curvearrowleft$}+}}%
70 }
71
72 \newcommand*\rightplus{%
73   \mathpalette\@rightplus\relax%
74 }
75
76 \newcommand*\@rightplus[1]{%

```

```

77 \mathbin{\vcenter{\hbox{$\math\overset{\scriptscriptstyle\#1+}{\to}$}}}%
78 }
79
80 \newcommand*\upplus{%
81 \mathbin{+\mathord{\uparrow}}%
82 }
83
84 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
85 % That's it %
86 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
87
88 % Finally, we'll use \endinput to indicate that LaTeX can stop reading
    this file. LaTeX will ignore anything after this line.
89 \endinput

```