

# stmmath package description

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

## Contents

<b>1. Commands</b>	<b>1</b>
1.1. Operators . . . . .	1
1.2. Symbols . . . . .	1
<b>2. Commands</b>	<b>1</b>
<b>3. Environments</b>	<b>2</b>
<b>A. The code</b>	<b>3</b>
A.1. <code>stmmath.sty</code> . . . . .	3
A.2. <code>stmmathbase.sty</code> . . . . .	5
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 tikz 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
24 % Adaptive Systems
25 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
26 % Content %
27 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
28
29 % Declare that this style file requires at least LaTeX
30 % version 2e.
31 \NeedsTeXFormat{LaTeX2e}
32
33 % Provide the name of your page, the date it was last updated
34 % , and a comment about what it's used for
35 \ProvidesPackage{stmmath}[2019/10/27 STMs custom LaTeX math
36 % definitions]
```

```

37 % -----
38
39 % 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
76 % stop reading this file. LaTeX will ignore anything after
77 % this line.
78 \endinput

```

## A.2. stmmathbase.sty

```
1 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
2 % Header %
3 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
4 %
5 % This is a interface to all stm tikz 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
24 %               Adaptive Systems
25 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
26 % Content %
27 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
28
29 % Declare that this style file requires at least LaTeX
30 %               version 2e.
31 \NeedsTeXFormat{LaTeX2e}
32
33 % Provide the name of your page, the date it was last updated
34 %   , and a comment about what it's used for
35 \ProvidesPackage{stmmathbase}[2019/10/27 STMs custom LaTeX
36 %               math definitions]
37
38 % -----
39 % Package
40 % -----
```

```

39 % Load amsmath to defined math operators
40 \@ifpackageloaded{amsmath}{\RequirePackage{amsmath}}%
41 \@ifpackageloaded{amssymb}{\RequirePackage{amssymb}}%
42
43 %%%%%%%%%%%%%
44 % That's it %
45 %%%%%%%%%%%%%
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 tikz 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}{$\m@th\curvearrowleft$}+}
70   %
71 }
72 \newcommand*\rightplus{%
73   \mathpalette\@rightplus\relax%
74 }
75
76 \newcommand*\@rightplus[1]{%
77   \mathbin{\vcenter{\hbox{$\m@th\overset{#1+}{\to}$}}}%
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
89   stop reading this file. LaTeX will ignore anything after
90   this line.
91 \endinput

```