stmmath package description

v20230914

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These are the math definitions for `stmlatex`. It is build upon the amsmath package.

Contents

1. Commands

1.1. Operators

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

1.2. Symbols

`\minus`	$-$
`\curveplus`	$\curvearrowright +$
`\rightplus`	$\overset{+}{\rightarrow}$
`\upplus`	$+\uparrow$

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

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Header                              %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% This is a interface to all stm math definitions
% Based upon the amsmath package:
%   https://ctan.org/pkg/amsmath
%
% Usage
%  - Preamble:
%    - \usepackage{stmmath}
%
% Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
%                       Initial draft
%
% Contact:   Martin Raedel,  martin.raedel@dlr.de
%            DLR Lightweight Systems
%
%                                  __/|__
%                                 /_/_/_/
%            www.dlr.de/sy/en       |/ DLR
%
% Copyright (C) 2019-... DLR Lightweight Systems
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Content                             %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Declare that this style file requires at least LaTeX version 2e.
\NeedsTeXFormat{LaTeX2e}

% Provide the name of your page, the date it was last updated, and a
    comment about what it's used for
\ProvidesPackage{stmmath}[2023/02/12 STMs custom LaTeX math definitions]

% ---------------------------
% Options
% ---------------------------

% For options
```

```
\@ifpackageloaded{kvoptions}{}{\RequirePackage{kvoptions}}%

% Option group
\SetupKeyvalOptions{%
  family=stmmath,%
  prefix=stmmath@,%
  setkeys=\kvsetkeys,%
}

% Items
\DeclareBoolOption[true]{items}

% Process options
\ProcessKeyvalOptions{stmmath}

% ----------------------------
% Modules
% ----------------------------

% Load the base package
\@ifpackageloaded{stmmathbase}{}{%
  \RequirePackage{stmmathbase}%
}%

% Load the items
\ifstmmath@items
  \@ifpackageloaded{stmmathitems}{}{%
    \RequirePackage{stmmathitems}%
  }%
\fi

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% That's it                          %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

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

A.2. stmmathbase.sty

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Header                             %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```
%
% This is a interface to all stm math definitions
% Based upon the amsmath package:
%   https://ctan.org/pkg/amsmath
%
% Usage
%  - Preamble:
%    - \usepackage{stmmathbase}
%
% Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
%                       Initial draft
%
% Contact:   Martin Raedel,  martin.raedel@dlr.de
%            DLR Lightweight Systems
%
%                                 __/|__
%                                /_/_/_/
%            www.dlr.de/sy/en      |/ DLR
%
% Copyright (C) 2019-... DLR Lightweight Systems
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Content                           %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Declare that this style file requires at least LaTeX version 2e.
\NeedsTeXFormat{LaTeX2e}

% Provide the name of your page, the date it was last updated, and a
    comment about what it's used for
\ProvidesPackage{stmmathbase}[2023/02/12 STMs custom LaTeX math
    definitions]

% ---------------------------
% Package
% ---------------------------

% Load amsmath to defined math operators
\@ifpackageloaded{amsmath}{}{\RequirePackage{amsmath}}%
\@ifpackageloaded{amssymb}{}{\RequirePackage{amssymb}}%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% That's it                         %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```

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

A.3. stmmathitems.sty

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Header                             %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% This is a interface to all stm math definitions
% Based upon the amsmath package:
%   https://ctan.org/pkg/amsmath
%
% Usage
%  - Preamble:
%    - \usepackage{stmmathitems}
%
% Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
%                       Initial draft
%
% Contact:   Martin Raedel,  martin.raedel@dlr.de
%            DLR Lightweight Systems
%
%                                 __/|__
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%
% Copyright (C) 2019-... DLR Lightweight Systems
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Content                            %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Declare that this style file requires at least LaTeX version 2e.
\NeedsTeXFormat{LaTeX2e}

% Provide the name of your page, the date it was last updated, and a comment about what it's used for
\ProvidesPackage{stmmathitems}[2023/02/12 STMs custom LaTeX math definitions]

% ---------------------------
```

```
% Package
% --------------------------

% Load base package
\@ifpackageloaded{stmmathbase}{}{\RequirePackage{stmmathbase}}%

% --------------------------
% Modules
% --------------------------

% Oeprators
\@ifundefined{dev}{\DeclareMathOperator{\dev}{dev}}{}
\@ifundefined{divergenceoperator}{\DeclareMathOperator{\
    divergenceoperator}{div}}{}
\@ifundefined{erf}{\DeclareMathOperator{\erf}{erf}}{}
\@ifundefined{sign}{\DeclareMathOperator{\sign}{sign}}{}
\@ifundefined{sph}{\DeclareMathOperator{\sph}{sph}}{}
\@ifundefined{spur}{\DeclareMathOperator{\spur}{Tr}}{}
\@ifundefined{Grad}{\DeclareMathOperator{\Grad}{Grad}}{}% englisch
    gradient w.r.t material coordinates
\@ifundefined{grad}{\DeclareMathOperator{\grad}{grad}}{}% englisch
    gradient w.r.t spatial coordinates

% --------------------------
% Symbols
% --------------------------

% Upright dif-symbol
\@ifundefined{dif}{\newcommand*\dif{\mathop{}\!\mathrm{d}}}{}

% shorter minus sign
\@ifpackageloaded{graphicx}{}{\RequirePackage{graphicx}}%
\@ifundefined{minus}{\newcommand{\minus}{\scalebox{0.75}[1.0]{$-$}}}{}

% Symbols for static equilibrium conditions:
\newcommand*\curveplus{%
  \mathbin{\rotatebox[origin=c]{90}{$\m@th\curvearrowleft$}+}%
}

\newcommand*\rightplus{%
  \mathpalette\@rightplus\relax%
}

\newcommand*\@rightplus[1]{%
```

```
  \mathbin{\vcenter{\hbox{$\m@th\overset{#1+}{\to}$}}}%
}

\newcommand*\upplus{%
  \mathbin{+\mathord\uparrow}%
}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% That's it                          %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

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