

# stmtikz package description

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v2019111

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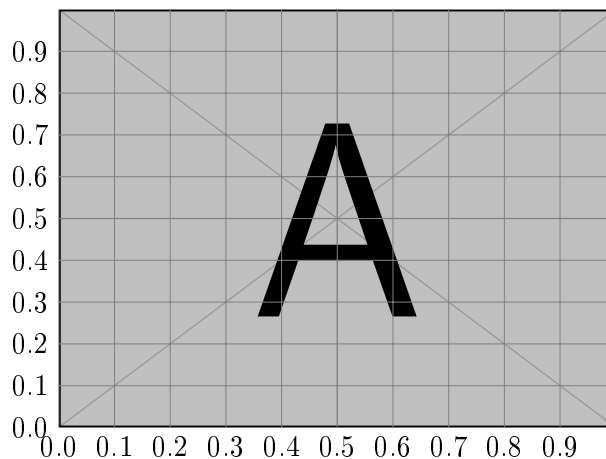
2019-11-01

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

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## 1. Externalization



## A. The code

### A.1. stmtikz.sty

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Header %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% This is a interface to all stm tikz definitions
% Based upon the tikz package:
%   https://ctan.org/pkg/tikz
%
% Usage
%   - Premble:
%     - \usepackage{stmtikz}
%
% Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
%              Initial draft
%
% Contact:    Martin Raedel, martin.raedel@dlr.de
%              DLR Composite Structures and Adaptive Systems
%
%              --/|--
%              /_/_/_/_/
%              www.dlr.de/fa/en      || DLR
%
% Copyright (C) 2019-... DLR Composite Structures and
%   Adaptive 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{stmtikz}[2019/10/27 STMs custom LaTeX tikz
  definitions]

% -----
% Package
```

```

% -----
\@ifpackageloaded{tikz}{%
%
}{%
  \RequirePackage{tikz}
}%

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

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

\DeclareStringOption[ZZZ_TikZ]{outputfolder}
\ProcessLocalKeyvalOptions*

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

% Libraries
\RequirePackage{stmtikzlibraries}

% Styles
\RequirePackage{stmtikzstyles}

% Externalization
\RequirePackage[outputfolder=\stmtikz@outputfolder]{
  stmtikzexternalization}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% 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. stmtikzlibraries.sty

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Header %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% This file includes unit definitions.
% Based upon the tikz package:
%   https://ctan.org/pkg/tikz
%
% Usage
%   - Preamble:
%     - \usepackage{stmtikzlibraries}
%
% Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
%              Initial draft
%
% Contact:   Martin Raedel, martin.raedel@dlr.de
%            DLR Composite Structures and Adaptive Systems
%
%
%              --/|--
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%
% Copyright (C) 2019-... DLR Composite Structures and
%   Adaptive 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{stmtikzlibraries}[2019/10/27 STMs custom
  LaTeX tikz library definitions]

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

```

\@ifpackageloaded{tikz}{%
%
}%
\RequirePackage{tikz}
}%

% -----
% Libraries
% -----

\usetikzlibrary{arrows.meta}
\usetikzlibrary{backgrounds}
\usetikzlibrary{calc}
\usetikzlibrary{decorations.markings}
\usetikzlibrary{decorations.text}
\usetikzlibrary{fit}
\usetikzlibrary{intersections}
\usetikzlibrary{tikzmark}
\usetikzlibrary{trees}
\usetikzlibrary{matrix}
\usetikzlibrary{mindmap}
\usetikzlibrary{patterns}
\usetikzlibrary{positioning}
\usetikzlibrary{shadows}
\usetikzlibrary{shadows.blur}
\usetikzlibrary{shapes}
\usetikzlibrary{shapes.misc}
\usetikzlibrary{spy}

% -----
% Pgfmath
% -----

% Stuff for calc compatiability.
\let\real=\pgfmath@calc@real
\let\minof=\pgfmath@calc@minof
\let\maxof=\pgfmath@calc@maxof
\let\ratio=\pgfmath@calc@ratio
\let\widthof=\pgfmath@calc@widthof
\let\heightof=\pgfmath@calc@heightof
\let\depthof=\pgfmath@calc@depthof

%%%%%%%%%%%%%%
% 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. stmtikzstyles.sty

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Header %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% This is a interface to all stm tikz definitions
% Based upon the tikz package:
%   https://ctan.org/pkg/tikz
%
% Usage
% - Preamble:
%   - \usepackage{stmtikzstyles}
%
% Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
%              Initial draft
%
% Contact:   Martin Raedel, martin.raedel@dlr.de
%            DLR Composite Structures and Adaptive Systems
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%
% Copyright (C) 2019-... DLR Composite Structures and
% Adaptive 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{stmtikzstyles}[2019/10/27 STMs custom LaTeX
tikz style definitions]

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

```

\@ifpackageloaded{tikz}{%
%
}%{
\RequirePackage{tikz}
}%

% -----
% Pgfkeys
% -----

% From the pgf manual 2.10csv page 694:
%
% It should be noted that all calculations must not
% exceed  $\pm 16383.99999$  at any point, because the underlying
% computations rely on TeX dimensions. This means that many
% of the underlying computations are necessarily approximate
% and that in addition, are not very fast. TeX is, after
% all, a typesetting language and not ideally suited to
% relatively advanced mathematical operations. However, it
% is possible to change the computations as described in
% Section 76.
%
% From the TeX Book page 114:
%
%  $16383.99998\text{pt}$  (TeX's largest dimen)
%
% In Notes On Programming in TeX Chirstian Feuersaenger
% pointed out
%
% The \dimen registers perform their arithmetic's
% internally with 32 bit scaled integers, so called scaled
% point with unit sp. It holds  $1\text{pt} = 65536\text{sp} = 2^{16}\text{sp}$ . One of
% the 32 bits is used as sign. The total number range in pt
% is  $[-(2^{30}-1)/2^{16}, (2^{30}-1)/2^{16}] = [-16383.9998, +16383.9998]1$ .
%
% 1 Please note that this does not cover the complete
% range of a 32 bit integer, I do not know why
% \pgfkeys{/pgf/fpu=true} % Allow pgf
% to plot values larger than 16383.9998
% \tikzset{fpu} % Allow pgf
% to plot values larger than 16383.9998

\pgfkeys{/tikz/savenumber/.code 2 args={\global\edef#1{#2}}}

```



```

% -----
% Styles
% -----

% Help grid for external images
% Call inside scope with: \pic{stmimagegrid};
\tikzset{%
  stmimagegrid/.pic={%
    \draw[help lines,xstep=.1,ystep=.1] (0,0) grid (1,1);%
    \foreach \x in {0,1,...,9} {\node [anchor=north] at (\x
      /10,0) {0.\x};}%
    \foreach \y in {0,1,...,9} {\node [anchor=east] at (0,\y
      /10) {0.\y};}%
  }%
}

% A cross for markings in plots
% https://tex.stackexchange.com/a/124064
\tikzset{%
  cross/.style={%
    cross out,%
    draw,%
    minimum size=2*(#1-\pgflinewidth),%
    inner sep=0pt,%
    outer sep=0pt,%
  }%
}%

% Beamer overlay feature
% https://tex.stackexchange.com/a/146991/44634
\tikzset{%
  invisible/.style={%
    opacity=0,%
    text opacity=0%
  },%
  visible on/.style={%
    alt={%
      #1{}{invisible}%
    }%
  },%
  alt/.code args={<#1>#2#3}{%
    \alt<#1>{\pgfkeysalso{#2}}{\pgfkeysalso{#3}} % \
      pgfkeysalso doesn't change the path
  }
}

```

```

    },
}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% 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.4. stmtikzexternalization.sty

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Header %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% This is a interface to tikz externalization definitions.
% All TikZ output is written to 'ZZZ_TikZ' folder.
% Based upon the tikz package:
%   https://ctan.org/pkg/tikz
%
% Usage
% - Preamble:
%   - \usepackage{stmtikzexternalization}
%
% Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
%               Initial draft
%
% Contact:      Martin Raedel, martin.raedel@dlr.de
%               DLR Composite Structures and Adaptive Systems
%
%               _ _ / | _ _
%               / _ / _ / _ /
%               www.dlr.de/fa/en      | / DLR
%
% Copyright (C) 2019-... DLR Composite Structures and
%   Adaptive 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{stmtikzexternalization}[2019/10/27 STMs
  custom LaTeX tikz externalization definitions]
%
% -----
% Package
% -----

```

```

\@ifpackageloaded{tikz}{%
%
}%
\RequirePackage{tikz}
}%

\@ifpackageloaded{pgfplots}{%
%
}%
\RequirePackage{pgfplots}
}%

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

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

\DeclareStringOption[ZZZ_TikZ]{outputfolder}
\ProcessLocalKeyvalOptions*

% -----
% Settings
% -----

\usepgfplotslibrary{external}
\tikzexternalize[%
mode=convert with system call,%
shell escape=-enable-write18,% % Use for MiKTeX
]
%\tikzsetexternalprefix{ZZZ_TikZ/} % Output folder
\tikzsetexternalprefix{\stmtikzexternalization@outputfolder/}
% Output folder
\tikzset{%
external/system call={%
pdflatex \tikzexternalcheckshellescape -halt-on-error %
-interaction=batchmode -jobname "\image" "\texsource" %&&
%
%convert -density 600 -transparent white "\image.pdf" "\

```

```

        image.png" % for ImageMagick versions <7
        %magick -density 600 -transparent white "\image.pdf" "\
        image.png" % for ImageMagick versions >= 7
    }
}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% 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

```