stmtikz package description

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

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1. Usage - in the preamble

1.1. Load the whole stmtikz package

1.1.1 Description

This is an interface package which loads tikz and definitions commonly required throughout document creation.

By default the package loads

- stmtikzbase.sty
- stmtikzlibraries.sty
- stmtikzstyles.sty
- stmtikzexternalization.sty

See subsubsection 1.1.2 for options to change the default package behavior.

1.1.2. Options

Option *libraries* This is a boolean option. Expected values are either true or false. It controls whether to load the standard libraries commonly required.

\usepackage[libraries=true|false]{stmtikz}

libraries=true is the default. It is used in case libraries=false is not set explicitly.

Option styles This is a boolean option. Expected values are either true or false. It controls whether to load the predefined tikz styles.

\usepackage[styles=true|false] {stmtikz}

styles=true is the default. It is used in case styles=false is not set explicitly.

Option externalization This is a boolean option. Expected values are either true or false. It enables and disables the possibilities for the externalization of tikzpictures.

\usepackage[externalization=true|false]{stmtikz}

externalization=true is the default. It is used in case externalization=false is not set explicitly.

By default, global externalization is not set by the package. Thus it is required to use \tikzexternalenable before the first picture, which is to be created with this feature. See Option globalexternalization for a possibility to allow a global externalization of throughout the document.

Option externalizationoutputfolder This option expects a string input. Do not add a slash at the end of the string.

With this option it is possible to define a output folder for all externalized tikzpictures in case Option externalization has the value true. The folder location is set relative to the directory of the main tex-file.

\usepackage[externalizationoutputfolder=\$FOLDERNAME\$]{stmtikz}

The default is externalizationoutputfolder=ZZZ_TikZ.

Option globalexternalization This is a boolean option. Expected values are either true or false.

By default externalization is not enabled for tikzpictures globally, meaning automatically activated for each tikzpicture. It has to be activated explicitly in the document with \tikzexternalenable.

It is possible to control this behavior with

\usepackage[globalexternalization=true|false]{stmtikz}

globalexternalization=false is the default. It is used in case globalexternalization=true is not set explicitly.

Global externalization is active until the next \tikzexternaldisable in your document.

1.2. stmtikzlibraries

This package contains standard libraries commonly required in the creation of tikzpictures.

1.3. stmtikzstyles

This package contains styles commonly required in the creation of tikzpictures.

1.4. stmtikzexternalization

1.4.1. Description

This package enables the externalization of tikzpictures.

It requires shell escape. Enabling shell escape is achieved by using the -shell-escape command line option when executing LATEX pdfLATEX, e.g.

```
pdflatex -shell-escape stmtikz.tex
  or with arara
arara: pdflatex: {shell: yes}
```

1.4.2. Options

Option outputfolder This option expects a string input. Do not add a slash at the end of the string.

With this option it is possible to define a output folder for all externalized tikzpictures. The folder location is set relative to the directory of the main tex-file.

\usepackage[outputfolder=\$FOLDERNAME\$] {stmtikzexternalization}

The default is outputfolder=ZZZ_TikZ.

Option globalexternalization This is a boolean option. Expected values are either true or false.

By default externalization is not enabled for tikzpictures globally, meaning automatically activated for each tikzpicture. It has to be activated explicitly in the document with \tikzexternalenable.

It is possible to control this behavior with

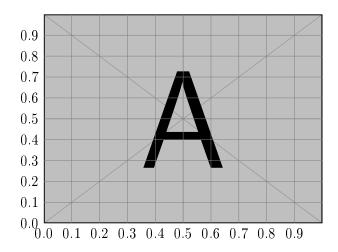
\usepackage[globalexternalization=true|false]{stmtikzexternalization}

globalexternalization=false is the default. It is used in case globalexternalization=true is not set explicitly.

Global externalization is active until the next \tikzexternaldisable in your document.

2. Externalization

This is a test for the externalization of a tikzpicture.



3. Known issues

misplaced \printindex error.

- There is an issue with the externalization of tikzpictures in case the imakeidx package is used.
- There are two possibilities:
 - 1. Load the imakeidx before any call to stmtikzexternalization
 \usepackage{imakeidx}
 \usepackage[externalization=true] {stmtikz}
 - 2. Load the package without externalization and load the feature after the call to imakeidx

```
\usepackage[externalization=false]{stmtikz}
\usepackage{imakeidx}
\usepackage{stmtikzexternalization}
```

A. The code

A.1. stmtikz.sty

```
2 % Header
4 %
5 % This is a interface to all stm tikz definitions
6 % Based upon the tikz package:
7 % https://ctan.org/pkg/tikz
8 %
9 % Usage
10 % - Preamble:
     - \usepackage{stmtikz}
11 %
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 Lightweight Systems
18 %
19 %
                             __/|__
20 %
                            /_/_/_/
21 %
                             |/ DLR
            www.dlr.de/sy/en
22 %
23 % Copyright (C) 2019-... DLR Lightweight Systems
24 %
26 % Content
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{stmtikz}[2023/02/12 STMs custom LaTeX tikz definitions]
34
35 % -----
36 % Options
37 % -----
38
39 % For options
```

```
40 \quad \texttt{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}{\cons}
41
42 % Option group
43 \SetupKeyvalOptions{%
44
                family=stmtikz,%
45
                prefix=stmtikz@,%
46
                setkeys=\kvsetkeys,%
47 }
48
49 % Libraries
50 \DeclareBoolOption[true]{libraries}
51
52 % Styles
53 \DeclareBoolOption[true] {styles}
54
55 % Externalization
57
58 % Global externalization
59 \DeclareBoolOption[false]{globalexternalization}
60
61 % Output folder
62 \DeclareStringOption[ZZZ_TikZ] {externalizationoutputfolder}
63
64 % Process options
65 \ \ProcessKeyvalOptions{stmtikz}
66
67 % -----
68 % Modules
69 % -----
70
71 % Load the base package
72 \@ifpackageloaded{stmtikzbase}{}{%
73 \RequirePackage{stmtikzbase}%
74 }%
75
76 % Libraries
77 \ifstmtikz@libraries
78
                \RequirePackage{stmtikzlibraries}
79 \fi
80
81 % Styles
82 \ifstmtikz@styles
83 \RequirePackage{stmtikzstyles}
```

```
84 \fi
85
86 % Externalization
87 \ifstmtikz@externalization
88
     \@ifpackageloaded{stmtikzexternalization}{}{
89
       \RequirePackage[%
90
         outputfolder=\stmtikz@externalizationoutputfolder,
91
         global={\ifstmtikz@globalexternalization true\else false\fi}
92
       ]{stmtikzexternalization}
93
94 \fi
95
97 % That's it
99
100\, % Finally, we'll use \endinput to indicate that LaTeX can stop reading
       this file. LaTeX will ignore anything after this line.
101 \endinput
```

A.2. stmtikzbase.sty

```
3
4 %
5 % This is a interface to stm base tikz package
6 % Based upon the tikz package:
7 % https://ctan.org/pkg/tikz
8
9 % Usage
10 % - Preamble:
11 % - \usepackage{stmtikzbase}
12 %
13 % Revisions: 2019-10-27 Martin Raedel <martin.raedel@dlr.de>
                      Initial draft
14 %
15 %
16 % Contact: Martin Raedel, martin.raedel@dlr.de
17 %
             DLR Lightweight Systems
18 %
19 %
                              __/|__
20 %
                              /_/_/_/
21 %
                               |/ DLR
             www.dlr.de/sy/en
22 %
```

```
23 % Copyright (C) 2019-... DLR Lightweight Systems
24 %
26 % Content
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{stmtikzbase}[2023/02/12 STMs custom LaTeX tikz
     definitions]
34
35 % -----
36 % Package
37 % -----
38
39 \@ifpackageloaded{tikz}{}{\RequirePackage{tikz}}%
40
42 % That's it
44
45 % Finally, we'll use \endinput to indicate that LaTeX can stop reading
     this file. LaTeX will ignore anything after this line.
46 \endinput
```

A.3. stmtikzlibraries.sty

```
15 %
16 % Contact: Martin Raedel, martin.raedel@dlr.de
17 %
             DLR Lightweight Systems
18 %
19 %
                               __/|__
20 %
                               ////
                              |/ DLR
21 %
             www.dlr.de/sy/en
22 %
23 % Copyright (C) 2019-... DLR Lightweight Systems
24 %
26 % Content
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{stmtikzlibraries}[2023/02/12 STMs custom LaTeX tikz
      library definitions]
34
35 % -----
36 % Package
37 % -----
38
39 \@ifpackageloaded{tikz}{}{\RequirePackage{tikz}}%
40
41 % -----
42 % Libraries
43 % -----
44
45 \usetikzlibrary{arrows.meta}
46 \usetikzlibrary{backgrounds}
47 \usetikzlibrary{calc}
48 \usetikzlibrary{decorations.markings}
49 \usetikzlibrary{decorations.text}
50 \usetikzlibrary{fit}
51 \usetikzlibrary{intersections}
52 \usetikzlibrary{tikzmark}
53 \usetikzlibrary{trees}
54 \usetikzlibrary{matrix}
55 \usetikzlibrary{mindmap}
56 \usetikzlibrary{patterns}
```

```
57 \usetikzlibrary{positioning}
58 \usetikzlibrary{shadows}
59 \usetikzlibrary{shadows.blur}
60 \usetikzlibrary{shapes}
62 \usetikzlibrary{spy}
63
64 % -----
65 % Pgfmath
66 % -----
67
68 % Stuff for calc compatiability.
69 \let\real=\pgfmath@calc@real
70 \let\minof=\pgfmath@calc@minof
71 \let\maxof=\pgfmath@calc@maxof
72 \let\ratio=\pgfmath@calc@ratio
73 \let\widthof=\pgfmath@calc@widthof
74 \let\heightof=\pgfmath@calc@heightof
75 \let\depthof=\pgfmath@calc@depthof
76
78 % That's it
80
81 % Finally, we'll use \endinput to indicate that LaTeX can stop reading
     this file. LaTeX will ignore anything after this line.
82 \endinput
```

A.4. stmtikzstyles.sty

```
15 %
16 % Contact: Martin Raedel, martin.raedel@dlr.de
17 %
              DLR Lightweight Systems
19 %
                                __/|__
20 %
                               ////
21 %
                               |/ DLR
              www.dlr.de/sy/en
22 %
23 % Copyright (C) 2019-... DLR Lightweight Systems
26 % Content
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
  \ProvidesPackage{stmtikzstyles}[2023/02/12 STMs custom LaTeX tikz style
      definitions]
34
35 % -----
36 % Package
37 % -----
38
39 \@ifpackageloaded{tikz}{}{\RequirePackage{tikz}}%
40 \@ifpackageloaded{stmcolors}{}{\RequirePackage{stmcolors}}%
41
42 % -----
43 % Pgfkeys
44 % -----
45
46 % From the pgf manual 2.10csv page 694:
47 %
48 %
        It should be noted that all calculations must not exceed
      +-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.
49 %
50 % From the TeX Book page 114:
```

```
51 %
52 %
        16383.99998pt (TeX's largest dimen)
53 %
54~\% In Notes On Programming in TeX Chirstian Feuersaenger pointed out
55 %
56 %
        The \dimen registers perform their arithmetic's internally with 32
      bit scaled integers, so called scaled point with unit sp. It holds 1pt
       = 65536sp = 216sp. 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.
57
58
       1 Please note that this does not cover the complete range of a 32
      bit integer, I do not know why
                                              % Allow pgf to plot
59 % \pgfkeys{/pgf/fpu=true}
      values larger than 16383.9998
60 % \tikzset{fpu}
                                                 % Allow pgf to plot
      values larger than 16383.9998
61
62 \pgfkeys{/tikz/savenumber/.code 2 args={\global\edef#1{#2}}}
63
64 % -----
65 % Styles
66 % -----
67
68 % Help grid for external images
69 % Call inside scope with: \pic{stmimagegrid};
70 \tikzset{%
71
     stmimagegrid/.pic={%
72
      \draw[help lines, xstep=.1, ystep=.1] (0,0) grid (1,1); %
73
      foreach \ x in \{0,1,...,9\} \{\node [anchor=north] at (\x/10,0) \{0.\x\};\}
      74
75
     }%
76 }
77
78 % Default arrow tip
79 \tikzset{
80
     stmdefaultarrow/.style={
                                                    % Define arrow style
81
       >=Stealth,
                                             % >=latex
82
83 }
84
85 % A cross for markings in plots
```

```
86 % https://tex.stackexchange.com/a/124064
87 \tikzset{%
88
      cross/.style={%
89
        cross out, %
90
        draw, %
91
        minimum size=2*(#1-\pgflinewidth),%
92
        inner sep=Opt,%
93
        outer sep=0pt,%
94
      }%
95 }%
96
97 % Beamer overlay feature
98 % https://tex.stackexchange.com/a/146991/44634
99 \tikzset{\%
100
      invisible/.style={%
101
        opacity=0,%
102
       text opacity=0%
103
      },%
104
      visible on/.style={%
105
        alt={%
106
          #1{}{invisible}%
107
        }%
108
      }.%
109
      alt/.code args={<#1>#2#3}{%
        110
       change the path
111
      },
112 }
113
114 \text{tikzset}
115
      stmmarkuptext/.style={%
116
        text=stmmarkupcolor, %
117
      }%
118 }
119
120 % Markup style for rectangles on external figures
121 \text{tikzset}
122
      stmrectangularmarkup/.style={%
123
       inner sep=Opt,% necessary for correct positioning of corners
124
       draw=stmmarkupcolor,%
125
       thick,%
126
      }%
127 }
128
```

```
129 % Equal space decoration markers along addplot path
130 % http://tex.stackexchange.com/a/232010/44634
131 \tikzset{
132
     nomorepostactions/.code={\let\tikz@postactions=\pgfutil@empty},
133
      stmmark/.style 2 args={decoration={markings,
134
       mark= between positions 0 and 1 step (1/11)*\pgfdecoratedpathlength
       with{%
135
           \tikzset{#2,every mark}\tikz@options
136
           \pgfuseplotmark{#1}%
137
         },
138
       },
139
       postaction={decorate},
140
       /pgfplots/legend image post style={
141
         mark=#1,
142
         #2,
143
         every path/.append style={nomorepostactions}
144
       },
145
     },
146 }
147
149 % That's it
151
152 % Finally, we'll use \endinput to indicate that LaTeX can stop reading
       this file. LaTeX will ignore anything after this line.
153 \endinput
```

A.5. stmtikzexternalization.sty

```
15 %
                      Initial draft
16 %
17 % Contact: Martin Raedel, martin.raedel@dlr.de
             DLR Lightweight Systems
19 %
20 %
                               __/|__
21 %
                              /_/_/_/
22 %
             www.dlr.de/sy/en
                              |/ DLR
23 %
24 % Copyright (C) 2019-... DLR Lightweight Systems
25 %
27 % Content
29
30\, % Declare that this style file requires at least LaTeX version 2e.
31 \NeedsTeXFormat{LaTeX2e}
32
33 % Provide the name of your page, the date it was last updated, and a
     comment about what it's used for
34 \ProvidesPackage{stmtikzexternalization}[2023/02/12 STMs custom LaTeX
      tikz externalization definitions]
35
36 % -----
37 % Package
38 % -----
39
40 \ensuremath{\texttt{Qifpackageloaded\{tikz\}\{\}}}\
41
42 % -----
43 % Options
44 % -----
45
46 % Options package
47 \@ifpackageloaded{kvoptions}{}{\RequirePackage{kvoptions}}%
48
49 % Option group
50 \SetupKeyvalOptions{%
51 family=stmtikzexternalization,%
52
    prefix=stmtikzexternalization@,%
53
    setkeys=\kvsetkeys,%
54 }
55
56 % Externalization
```

```
57 \DeclareBoolOption[false] {global}
58
59 % Output folder
60 \DeclareStringOption[ZZZ_TikZ] {outputfolder}
62 % Process options
63 \ProcessKeyvalOptions{stmtikzexternalization}
64
65 % -----
66 % Libraries
67 % -----
68
69 \usetikzlibrary{external}
70
71 % -----
72 % Settings
74
75 \tikzexternalize[%
76 mode=convert with system call,%
     shell escape=-enable-write18,% % Use for MiKTeX
77
78 ]
79
80 % Output folder
81 \tikzsetexternalprefix{\stmtikzexternalization@outputfolder/}
82
83 % Set
84 \tikzset{%
     external/system call={%
85
86
       pdflatex \tikzexternalcheckshellescape -halt-on-error %
87
       -interaction=batchmode -jobname "\image" "\texsource" %&& %
      \% convert -density 600 -transparent white "\image.pdf" "\image.png" \%
88
      for ImageMagick versions <7</pre>
89
      %magick -density 600 -transparent white "\image.pdf" "\image.png" %
      for ImageMagick versions >= 7
90
     }
91 }
92
93 % By default, do not allow global externalization
94 \ifstmtikzexternalization@global
95 \tikzexternalenable
96 \else
97 \tikzexternaldisable
98 \fi
```