The resizegather package

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Abstract

Equations that are too large are resized to fit the available space. The environment gather of package amsmath is supported. Also the environments equation and displaymath are redefined using gather and its starred version.

Contents

1 Documentation

Sometimes an equation is just a little to large to fit in the line. And breaking the equation across lines might be worse than downscaling the equation. This package implements this for the environments gather and gather∗ of package amsmath. That package already measures the equations and simplifies the implementation of resizegather that only needs to hook into amsmath's code to add the resizing feature.

Resized equations are recorded in the `..log` file for small exceeds (default setting is smaller than five percent). Otherwise a warning is given.

Also environments equation and displaymath are supported by redefining them using gather and gather∗.

`\[` and `\]` are not supported, because these macros are not in environment form that is required for amsmath. The environment body is collected first to be able to process the body twice for measuring first.

Also the environments using alignments are not supported. If a single equation line would be resized, the alignment would get lost. And resizing all equations of the alignment does not seem appropriate either.

1.1 Options

warningthreshold: Print a warning if the original equation line exceeds its available width by the given fraction. Default is `0.05`: A warning is given if the equation is too large by five percent. Otherwise the exceed is recorded in the `..log` file only.

The next options are boolean options. They are enabled by value `true` or if no value is given. They are switched off by value `false`.

enable: The resize feature is active (default).

disable: The complementary option for enable, added for convenience: `disable` (or `disable=true`) is the same as `enable=false`.

equations: LaTeX environments equation and displaymath environments are redefined. These equations are now using environment gather and gather∗. This is the default.

The following table shows additional options if you want to have finer control for the redefined environments:

	Environments	
Option	equation	displaymath
equations	gather	gather∗
equation	gather	*unchanged*
displaymath	*unchanged*	gather∗

If such an option is switched off, the original meaning of the affected environments is restored.

Options are evaluated in the following order:

1. Configuration file `resizegather.cfg` using `\resizegathersetup` if the file exists.
2. Package options given for `\usepackage`.
3. Later calls of `\resizegathersetup`.

`\resizegathersetup{`⟨*option list*⟩`}`

The options are key value options. Boolean options are enabled by default (without value) or by using the explicit value `true`. Value `false` disable the option.

1.2 Options for packages amsmath or graphics

The package loads the package amsmath because is internally measures the equations first. Thus this package hooks into this code in order to resize the equations if they are too large. The resizing itself is done by `\resizebox` of package graphics. If you need special options for these packages, just load them first or use global options when appropriate. Example:

```
\usepackage[dvipdfm]{graphicx}% or graphics
\usepackage[fleqn]{amsmath}
\usepackage{resizegather}
```

2 Implementation

```
1 ⟨*package⟩
```

Reload check, especially if the package is not used with LaTeX.

```
2 \begingroup
3   \catcode44 12 % ,
4   \catcode45 12 % -
5   \catcode46 12 % .
6   \catcode58 12 % :
7   \catcode64 11 % @
8   \catcode123 1 % {
9   \catcode125 2 % }
10  \expandafter\let\expandafter\x\csname ver@resizegather.sty\endcsname
11  \ifx\x\relax % plain-TeX, first loading
12  \else
13    \def\empty{}%
14    \ifx\x\empty % LaTeX, first loading,
15      % variable is initialized, but \ProvidesPackage not yet seen
16    \else
17      \catcode35 6 % #
18      \expandafter\ifx\csname PackageInfo\endcsname\relax
19        \def\x#1#2{%
20          \immediate\write-1{Package #1 Info: #2.}%
21        }%
22      \else
23        \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
24      \fi
25      \x{resizegather}{The package is already loaded}%
26      \aftergroup\endinput
27    \fi
28  \fi
29 \endgroup
```

Package identification:

```
30 \begingroup
31   \catcode35 6 % #
32   \catcode40 12 % (
33   \catcode41 12 % )
34   \catcode44 12 % ,
35   \catcode45 12 % -
36   \catcode46 12 % .
37   \catcode47 12 % /
38   \catcode58 12 % :
39   \catcode64 11 % @
40   \catcode91 12 % [
41   \catcode93 12 % ]
42   \catcode123 1 % {
43   \catcode125 2 % }
44   \expandafter\ifx\csname ProvidesPackage\endcsname\relax
45     \def\x#1#2#3[#4]{\endgroup
46       \immediate\write-1{Package: #3 #4}%
47       \xdef#1{#4}%
48     }%
49   \else
50     \def\x#1#2[#3]{\endgroup
51       #2[{#3}]%
52       \ifx#1\@undefined
53         \xdef#1{#3}%
54       \fi
55       \ifx#1\relax
56         \xdef#1{#3}%
57       \fi
58     }%
```

```
  \fi
\expandafter\x\csname ver@resizegather.sty\endcsname
\ProvidesPackage{resizegather}%
  [2010/03/01 v1.2 Automatically resizing of too large equations (HO)]
\begingroup
  \catcode123 1 % {
  \catcode125 2 % }
  \def\x{\endgroup
    \expandafter\edef\csname ResizeGather@AtEnd\endcsname{%
      \catcode35 \the\catcode35\relax
      \catcode64 \the\catcode64\relax
      \catcode123 \the\catcode123\relax
      \catcode125 \the\catcode125\relax
    }%
  }%
\x
\catcode35 6 % #
\catcode64 11 % @
\catcode123 1 % {
\catcode125 2 % }
\def\TMP@EnsureCode#1#2{%
  \edef\ResizeGather@AtEnd{%
    \ResizeGather@AtEnd
    \catcode#1 \the\catcode#1\relax
  }%
  \catcode#1 #2\relax
}
\TMP@EnsureCode{10}{12}% ^^J
\TMP@EnsureCode{33}{12}% !
\TMP@EnsureCode{36}{3}% $
\TMP@EnsureCode{38}{4}% &
\TMP@EnsureCode{39}{12}% '
\TMP@EnsureCode{40}{12}% (
\TMP@EnsureCode{41}{12}% )
\TMP@EnsureCode{42}{12}% *
\TMP@EnsureCode{43}{12}% +
\TMP@EnsureCode{44}{12}% ,
\TMP@EnsureCode{45}{12}% -
\TMP@EnsureCode{46}{12}% .
\TMP@EnsureCode{47}{12}% /
\TMP@EnsureCode{58}{12}% :
\TMP@EnsureCode{59}{12}% ;
\TMP@EnsureCode{60}{12}% <
\TMP@EnsureCode{61}{12}% =
\TMP@EnsureCode{62}{12}% >
\TMP@EnsureCode{63}{12}% ?
\TMP@EnsureCode{91}{12}% [
\TMP@EnsureCode{93}{12}% ]
\TMP@EnsureCode{94}{7}% ^ (superscript)
\TMP@EnsureCode{96}{12}% `
\RequirePackage{kvoptions}[2009/12/04]
\SetupKeyvalOptions{%
  family=resizegather,%
  prefix=ResizeGather@,%
}
\@for\ResizeGather@option:=%
  centertags,%
  tbtags,%
  sumlimits,%
  nosumlimits,%
  intlimits,%
  nointlimits,%
```

```
  nonamelimits,%
  leqno,%
  reqno,%
  fleqn%
\do{%
  \edef\ResizeGather@temp{%
    \noexpand\DeclareVoidOption{\ResizeGather@option}{%
      \noexpand\PassOptionsToPackage{amsmath}{\ResizeGather@option}%
    }%
    \noexpand\AtEndOfPackage{%
      \noexpand\DisableKeyvalOption[%
        action=error,%
        package=resizegather,%
      ]{resizegather}{\ResizeGather@option}%
    }%
  }%
  \ResizeGather@temp
}
\@for\ResizeGather@option:=%
  draft,%
  final,%
  hiderotate,%
  hidescale,%
  hiresbb,%
  demo,%
  dvips,xdvi,dvipdf,dvipdfm,dvipdfmx,pdftex,dvipsone,%
  dviwindo,emtex,dviwin,pctexps,pctexwin,pctexhp,pctex32,%
  truetex,tcidvi,vtex,oztex,textures,xetex%
\do{%
  \edef\ResizeGather@temp{%
    \noexpand\DeclareVoidOption{\ResizeGather@option}{%
      \noexpand\PassOptionsToPackage{graphics}{\ResizeGather@option}%
    }%
    \noexpand\AtEndOfPackage{%
      \noexpand\DisableKeyvalOption[%
        action=error,%
        package=resizegather,%
      ]{resizegather}{\ResizeGather@option}%
    }%
  }%
  \ResizeGather@temp
}
\DeclareBoolOption[true]{enable}
\DeclareComplementaryOption{disable}{enable}
\DeclareStringOption[.05]{warningthreshold}
\newif\ifResizeGather@NeedInit
\DeclareBoolOption[true]{equations}
\DeclareBoolOption[true]{equation}
\DeclareBoolOption[true]{displaymath}
\AddToKeyvalOption*{equations}{%
  \ResizeGather@NeedInittrue
  \ifResizeGather@equations
    \ResizeGather@equationtrue
    \ResizeGather@displaymathtrue
  \else
    \ResizeGather@equationfalse
    \ResizeGather@displaymathfalse
  \fi
}
\AddToKeyvalOption*{equation}{%
  \ResizeGather@NeedInittrue
}
```

```
\AddToKeyvalOption*{displaymath}{%
  \ResizeGather@NeedInittrue
}
```

\resizegathersetup

```
\newcommand*{\resizegathersetup}[1]{%
  \ResizeGather@NeedInitfalse
  \setkeys{resizegather}{#1}%
  \ifResizeGather@NeedInit
    \ResizeGather@init
  \fi
}
\let\ResizeGather@init\relax

\InputIfFileExists{resizegather.cfg}{}{}%
\ProcessKeyvalOptions*\relax

\RequirePackage{amsmath}
\RequirePackage{graphics}
```

\ResizeGather@redefine

```
\def\ResizeGather@redefine#1#2#3#4#5{%
  \csname ifResizeGather@#1\endcsname
    \@ifundefined{ResizeGather@org@#2}{%
      \expandafter\let\csname ResizeGather@org@#2\expandafter\endcsname
                      \csname #2\endcsname
    }{}%
    \@ifundefined{ResizeGather@org@#3}{%
      \expandafter\let\csname ResizeGather@org@#3\expandafter\endcsname
                      \csname #3\endcsname
    }{}%
    \expandafter\edef\csname #2\endcsname{%
      \expandafter\noexpand\csname#4\endcsname
    }%
    \expandafter\edef\csname #3\endcsname{%
      \expandafter\noexpand\csname#5\endcsname
    }%
  \else
    \@ifundefined{ResizeGather@org@#2}{}{%
      \expandafter\let\csname #2\expandafter\endcsname
                      \csname ResizeGather@org@#2\endcsname
      \expandafter\let\csname #3\expandafter\endcsname
                      \csname ResizeGather@org@#3\endcsname
    }%
  \fi
}
```

\ResizeGather@init

```
\def\ResizeGather@init{%
  \ResizeGather@redefine{equation}{equation}{endequation}%
    {gather}{endgather}%
  \ResizeGather@redefine{displaymath}{displaymath}{enddisplaymath}%
    {gather*}{endgather*}%
}
\ResizeGather@init
```

\ResizeGather@ResizeGather

```
\def\ResizeGather@ResizeGather{%
  \ifResizeGather@enable
    \dimen@\displaywidth
    \if@fleqn
      \advance\dimen@-\@mathmargin
    \fi
```

```
    \ifdim\wdz@>\dimen@
      \begingroup
        \advance\dimen@ -\wdz@
        \dimen@ -\dimen@
        \ifdim\ResizeGather@warningthreshold\wdz@>\dimen@
          \expandafter\PackageInfo
        \else
          \expandafter\PackageWarning
        \fi
        {resizegather}{%
          Equation line \the\row@\space is too large %
          by \the\dimen@\MessageBreak
          in environment `\@currenvir'%
        }%
      \endgroup
      \setboxz@h to\dimen@{%
        \resizebox{\dimen@}{!}{\boxz@}%
        \hss
      }%
    \fi
  \fi
}
```

\calc@shift@gather

```
\expandafter\def\expandafter\calc@shift@gather\expandafter{%
  \expandafter\ResizeGather@ResizeGather
  \calc@shift@gather
}
```

\ResizeGather@org@gmeasure@

```
\let\ResizeGather@org@gmeasure@\gmeasure@
```

\gmeasure@

```
\def\gmeasure@#1{%
  \ResizeGather@org@gmeasure@{#1}%
  \ifResizeGather@enable
    \ifdim\totwidth@>\displaywidth
      \totwidth@=\displaywidth
    \fi
  \fi
}

\ResizeGather@AtEnd
⟨/package⟩
```

3 Test

3.1 Catcode checks for loading

⟨*test1⟩

```
\catcode`\{=1 %
\catcode`\}=2 %
\catcode`\#=6 %
\catcode`\@=11 %
\expandafter\ifx\csname count@\endcsname\relax
  \countdef\count@=255 %
\fi
\expandafter\ifx\csname @gobble\endcsname\relax
  \long\def\@gobble#1{}%
\fi
\expandafter\ifx\csname @firstofone\endcsname\relax
```

```
  \long\def\@firstofone#1{#1}%
\fi
\expandafter\ifx\csname loop\endcsname\relax
  \expandafter\@firstofone
\else
  \expandafter\@gobble
\fi
{%
  \def\loop#1\repeat{%
    \def\body{#1}%
    \iterate
  }%
  \def\iterate{%
    \body
      \let\next\iterate
    \else
      \let\next\relax
    \fi
    \next
  }%
  \let\repeat=\fi
}%
\def\RestoreCatcodes{}
\count@=0 %
\loop
  \edef\RestoreCatcodes{%
    \RestoreCatcodes
    \catcode\the\count@=\the\catcode\count@\relax
  }%
\ifnum\count@<255 %
  \advance\count@ 1 %
\repeat

\def\RangeCatcodeInvalid#1#2{%
  \count@=#1\relax
  \loop
    \catcode\count@=15 %
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
  \repeat
}
\expandafter\ifx\csname LoadCommand\endcsname\relax
  \def\LoadCommand{\input resizegather.sty\relax}%
\fi
\def\Test{%
  \RangeCatcodeInvalid{0}{47}%
  \RangeCatcodeInvalid{58}{64}%
  \RangeCatcodeInvalid{91}{96}%
  \RangeCatcodeInvalid{123}{255}%
  \catcode`\@=12 %
  \catcode`\\=0 %
  \catcode`\{=1 %
  \catcode`\}=2 %
  \catcode`\#=6 %
  \catcode`\[=12 %
  \catcode`\]=12 %
  \catcode`\%=14 %
  \catcode`\ =10 %
  \catcode13=5 %
  \LoadCommand
  \RestoreCatcodes
}
```

```
\Test
\csname @@end\endcsname
\end
```
⟨/test1⟩

4 Installation

4.1 Download

Package. This package is available on CTAN[1]:

CTAN:macros/latex/contrib/oberdiek/resizegather.dtx The source file.

CTAN:macros/latex/contrib/oberdiek/resizegather.pdf Documentation.

Bundle. All the packages of the bundle 'oberdiek' are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

CTAN:install/macros/latex/contrib/oberdiek.tds.zip

TDS refers to the standard "A Directory Structure for TEX Files" (CTAN:tds/tds.pdf). Directories with `texmf` in their name are usually organized this way.

4.2 Bundle installation

Unpacking. Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

Script installation. Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package attachfile2 comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

4.3 Package installation

Unpacking. The `.dtx` file is a self-extracting docstrip archive. The files are extracted by running the `.dtx` through plain-TEX:

```
tex resizegather.dtx
```

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```
resizegather.sty            → tex/latex/oberdiek/resizegather.sty
resizegather.pdf            → doc/latex/oberdiek/resizegather.pdf
test/resizegather-test1.tex → doc/latex/oberdiek/test/resizegather-test1.tex
resizegather.dtx            → source/latex/oberdiek/resizegather.dtx
```

If you have a `docstrip.cfg` that configures and enables docstrip's TDS installing feature, then some files can already be in the right place, see the documentation of docstrip.

4.4 Refresh file name databases

If your TEX distribution (teTEX, mikTEX, ...) relies on file name databases, you must refresh these. For example, teTEX users run `texhash` or `mktexlsr`.

[1] ftp://ftp.ctan.org/tex-archive/

4.5 Some details for the interested

Attached source. The PDF documentation on CTAN also includes the `.dtx` source file. It can be extracted by AcrobatReader 6 or higher. Another option is pdftk, e.g. unpack the file into the current directory:

```
pdftk resizegather.pdf unpack_files output .
```

Unpacking with LaTeX. The `.dtx` chooses its action depending on the format:

plain-TeX: Run docstrip and extract the files.

LaTeX: Generate the documentation.

If you insist on using LaTeX for docstrip (really, docstrip does not need LaTeX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{resizegather.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

Generating the documentation. You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by the configuration file `ltxdoc.cfg`. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfLaTeX:

```
pdflatex resizegather.dtx
makeindex -s gind.ist resizegather.idx
pdflatex resizegather.dtx
makeindex -s gind.ist resizegather.idx
pdflatex resizegather.dtx
```

5 Acknowledgement

Dieter Jurzitza: He wanted the resizing feature at the TeX table in Karlsruhe of December 2009. Thus this package is a kind of Christmas present.

6 History

[2009/12/04 v1.0]

- The first version.

[2009/12/05 v1.1]

- Options enable and disable added.

[2010/03/01 v1.2]

- TDS location moved from ‘generic’ to ‘latex’.

7 Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

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