

# The `resizegather` package

Heiko Oberdiek  
<heiko.oberdiek at googlemail.com>

2010/03/01 v1.2

## 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.

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## 1 Documentation

Sometimes an equation is just a little too 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:** L<sup>A</sup>T<sub>E</sub>X 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:

Option	Environments	
	<code>equation</code>	<code>displaymath</code>
<code>equations</code>	<code>gather</code>	<code>gather*</code>
<code>equation</code>	<code>gather</code>	<i>unchanged</i>
<code>displaymath</code>	<i>unchanged</i>	<code>gather*</code>

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 it 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@resizgather.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{resizgather}{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   }%

```

```

59 \fi
60 \expandafter\x\csname ver@resizegather.sty\endcsname
61 \ProvidesPackage{resizegather}%
62 [2010/03/01 v1.2 Automatically resizing of too large equations (HO)]
63 \begingroup
64 \catcode123 1 % {
65 \catcode125 2 % }
66 \def\x{\endgroup
67 \expandafter\edef\csname ResizeGather@AtEnd\endcsname{%
68 \catcode35 \the\catcode35\relax
69 \catcode64 \the\catcode64\relax
70 \catcode123 \the\catcode123\relax
71 \catcode125 \the\catcode125\relax
72 }%
73 }%
74 \x
75 \catcode35 6 % #
76 \catcode64 11 % @
77 \catcode123 1 % {
78 \catcode125 2 % }
79 \def\TMP@EnsureCode#1#2{%
80 \edef\ResizeGather@AtEnd{%
81 \ResizeGather@AtEnd
82 \catcode#1 \the\catcode#1\relax
83 }%
84 \catcode#1 #2\relax
85 }
86 \TMP@EnsureCode{10}{12}% ^^J
87 \TMP@EnsureCode{33}{12}% !
88 \TMP@EnsureCode{36}{3}% $
89 \TMP@EnsureCode{38}{4}% &
90 \TMP@EnsureCode{39}{12}% '
91 \TMP@EnsureCode{40}{12}% (
92 \TMP@EnsureCode{41}{12}% )
93 \TMP@EnsureCode{42}{12}% *
94 \TMP@EnsureCode{43}{12}% +
95 \TMP@EnsureCode{44}{12}% ,
96 \TMP@EnsureCode{45}{12}% -
97 \TMP@EnsureCode{46}{12}% .
98 \TMP@EnsureCode{47}{12}% /
99 \TMP@EnsureCode{58}{12}% :
100 \TMP@EnsureCode{59}{12}% ;
101 \TMP@EnsureCode{60}{12}% <
102 \TMP@EnsureCode{61}{12}% =
103 \TMP@EnsureCode{62}{12}% >
104 \TMP@EnsureCode{63}{12}% ?
105 \TMP@EnsureCode{91}{12}% [
106 \TMP@EnsureCode{93}{12}% ]
107 \TMP@EnsureCode{94}{7}% ^ (superscript)
108 \TMP@EnsureCode{96}{12}% '
109 \RequirePackage{kvoptions}[2009/12/04]
110 \SetupKeyvalOptions{%
111 family=resizegather,%
112 prefix=ResizeGather@,%
113 }
114 \@for\ResizeGather@option:=%
115 centertags,%
116 tbtags,%
117 sumlimits,%
118 nosumlimits,%
119 intlimits,%
120 nointlimits,%

```

```

121 nonamelimits,%
122 leqno,%
123 reqno,%
124 fleqn%
125 \do{%
126   \edef\ResizeGather@temp{%
127     \noexpand\DeclareVoidOption{\ResizeGather@option}{%
128       \noexpand\PassOptionsToPackage{amsmath}{\ResizeGather@option}%
129     }%
130     \noexpand\AtEndOfPackage{%
131       \noexpand\DisableKeyvalOption[%
132         action=error,%
133         package=resizegather,%
134       ]{resizegather}{\ResizeGather@option}%
135     }%
136   }%
137   \ResizeGather@temp
138 }
139 \@for\ResizeGather@option:=%
140 draft,%
141 final,%
142 hiderotate,%
143 hidescale,%
144 hiresbb,%
145 demo,%
146 dvips,xdvi,dvipdf,dvipdfm,dvipdfmx,pdftex,dvipsone,%
147 dviwindo,emtex,dviwin,pctexps,pctexwin,pctexhp,pctex32,%
148 truetex,tcidvi,vtex,oztex,textures,xetex%
149 \do{%
150   \edef\ResizeGather@temp{%
151     \noexpand\DeclareVoidOption{\ResizeGather@option}{%
152       \noexpand\PassOptionsToPackage{graphics}{\ResizeGather@option}%
153     }%
154     \noexpand\AtEndOfPackage{%
155       \noexpand\DisableKeyvalOption[%
156         action=error,%
157         package=resizegather,%
158       ]{resizegather}{\ResizeGather@option}%
159     }%
160   }%
161   \ResizeGather@temp
162 }

163 \DeclareBoolOption[true]{enable}
164 \DeclareComplementaryOption{disable}{enable}
165 \DeclareStringOption[.05]{warningthreshold}
166 \newif\ifResizeGather@NeedInit
167 \DeclareBoolOption[true]{equations}
168 \DeclareBoolOption[true]{equation}
169 \DeclareBoolOption[true]{displaymath}
170 \AddToKeyvalOption*{equations}{%
171   \ResizeGather@NeedInittrue
172   \ifResizeGather@equations
173     \ResizeGather@equationtrue
174     \ResizeGather@displaymathtrue
175   \else
176     \ResizeGather@equationfalse
177     \ResizeGather@displaymathfalse
178   \fi
179 }
180 \AddToKeyvalOption*{equation}{%
181   \ResizeGather@NeedInittrue
182 }

```

```

183 \AddToKeyvalOption*{displaymath}{}%
184 \ResizeGather@NeedInittrue
185 }

\resizegathersetup
186 \newcommand*{\resizegathersetup}[1]{%
187 \ResizeGather@NeedInitfalse
188 \setkeys{resizegather}{#1}%
189 \ifResizeGather@NeedInit
190 \ResizeGather@init
191 \fi
192 }
193 \let\ResizeGather@init\relax

194 \InputIfFileExists{resizegather.cfg}{-}{-}%
195 \ProcessKeyvalOptions*\relax

196 \RequirePackage{amsmath}
197 \RequirePackage{graphics}

\ResizeGather@redefine
198 \def\ResizeGather@redefine#1#2#3#4#5{%
199 \csname ifResizeGather@#1\endcsname
200 \@ifundefined{ResizeGather@org@#2}{-%
201 \expandafter\let\csname ResizeGather@org@#2\expandafter\endcsname
202 \csname #2\endcsname
203 }-%
204 \@ifundefined{ResizeGather@org@#3}{-%
205 \expandafter\let\csname ResizeGather@org@#3\expandafter\endcsname
206 \csname #3\endcsname
207 }-%
208 \expandafter\edef\csname #2\endcsname{%
209 \expandafter\noexpand\csname#4\endcsname
210 }%
211 \expandafter\edef\csname #3\endcsname{%
212 \expandafter\noexpand\csname#5\endcsname
213 }%
214 \else
215 \@ifundefined{ResizeGather@org@#2}{-%
216 \expandafter\let\csname #2\expandafter\endcsname
217 \csname ResizeGather@org@#2\endcsname
218 \expandafter\let\csname #3\expandafter\endcsname
219 \csname ResizeGather@org@#3\endcsname
220 }%
221 \fi
222 }

\ResizeGather@init
223 \def\ResizeGather@init{%
224 \ResizeGather@redefine{equation}{equation}{endequation}%
225 {gather}{endgather}%
226 \ResizeGather@redefine{displaymath}{displaymath}{enddisplaymath}%
227 {gather*}{endgather*}%
228 }
229 \ResizeGather@init

\ResizeGather@ResizeGather
230 \def\ResizeGather@ResizeGather{%
231 \ifResizeGather@enable
232 \dimen@{displaywidth
233 \if@fleqn
234 \advance\dimen@- \@mathmargin
235 \fi

```

```

236 \ifdim\wdz@>\dimen@
237 \begingroup
238 \advance\dimen@ -\wdz@
239 \dimen@ -\dimen@
240 \ifdim\ResizeGather@warningthreshold\wdz@>\dimen@
241 \expandafter\PackageInfo
242 \else
243 \expandafter\PackageWarning
244 \fi
245 {resizegather}{%
246 Equation line \the\row@\space is too large %
247 by \the\dimen@\MessageBreak
248 in environment '@currentenvir'%
249 }%
250 \endgroup
251 \setboxz@h to\dimen@{%
252 \resizebox{\dimen@}{!}{\boxz@}%
253 \hss
254 }%
255 \fi
256 \fi
257 }

\calc@shift@gather

258 \expandafter\def\expandafter\calc@shift@gather\expandafter{%
259 \expandafter\ResizeGather@ResizeGather
260 \calc@shift@gather
261 }

\ResizeGather@org@gmeasure@

262 \let\ResizeGather@org@gmeasure@\gmeasure@

\gmeasure@

263 \def\gmeasure@#1{%
264 \ResizeGather@org@gmeasure@{#1}%
265 \ifResizeGather@enable
266 \ifdim\totwidth@>\displaywidth
267 \totwidth@=\displaywidth
268 \fi
269 \fi
270 }

271 \ResizeGather@AtEnd
272 </package>

```

### 3 Test

#### 3.1 Catcode checks for loading

```

273 <{*test1}

274 \catcode'\{=1 %
275 \catcode'\}=2 %
276 \catcode'\#=6 %
277 \catcode'\@=11 %
278 \expandafter\ifx\csname count@\endcsname\relax
279 \countdef\count@=255 %
280 \fi
281 \expandafter\ifx\csname @gobble\endcsname\relax
282 \long\def\@gobble#1{%
283 \fi
284 \expandafter\ifx\csname @firstofone\endcsname\relax

```

```

285 \long\def\@firstofone#1{#1}%
286 \fi
287 \expandafter\ifx\csname loop\endcsname\relax
288 \expandafter\@firstofone
289 \else
290 \expandafter\@gobble
291 \fi
292 {%
293 \def\loop#1\repeat{%
294 \def\body{#1}%
295 \iterate
296 }%
297 \def\iterate{%
298 \body
299 \let\next\iterate
300 \else
301 \let\next\relax
302 \fi
303 \next
304 }%
305 \let\repeat=\fi
306 }%
307 \def\RestoreCatcodes{}
308 \count@=0 %
309 \loop
310 \edef\RestoreCatcodes{%
311 \RestoreCatcodes
312 \catcode\the\count@=\the\catcode\count@\relax
313 }%
314 \ifnum\count@<255 %
315 \advance\count@ 1 %
316 \repeat
317
318 \def\RangeCatcodeInvalid#1#2{%
319 \count@=#1\relax
320 \loop
321 \catcode\count@=15 %
322 \ifnum\count@<#2\relax
323 \advance\count@ 1 %
324 \repeat
325 }
326 \expandafter\ifx\csname LoadCommand\endcsname\relax
327 \def\LoadCommand{\input resizegather.sty\relax}%
328 \fi
329 \def\Test{%
330 \RangeCatcodeInvalid{0}{47}%
331 \RangeCatcodeInvalid{58}{64}%
332 \RangeCatcodeInvalid{91}{96}%
333 \RangeCatcodeInvalid{123}{255}%
334 \catcode'\@=12 %
335 \catcode'\=0 %
336 \catcode'\{=1 %
337 \catcode'\}=2 %
338 \catcode'\#=6 %
339 \catcode'\[=12 %
340 \catcode'\]=12 %
341 \catcode'\%=14 %
342 \catcode'\ =10 %
343 \catcode13=5 %
344 \LoadCommand
345 \RestoreCatcodes
346 }

```



```

347 \Test
348 \csname @@end\endcsname
349 \end
350 </test1>

```

## 4 Installation

### 4.1 Download

**Package.** This package is available on CTAN<sup>1</sup>:

[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 T<sub>E</sub>X 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-T<sub>E</sub>X:

```
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):

<code>resizegather.sty</code>	→ <code>tex/latex/oberdiek/resizegather.sty</code>
<code>resizegather.pdf</code>	→ <code>doc/latex/oberdiek/resizegather.pdf</code>
<code>test/resizegather-test1.tex</code>	→ <code>doc/latex/oberdiek/test/resizegather-test1.tex</code>
<code>resizegather.dtx</code>	→ <code>source/latex/oberdiek/resizegather.dtx</code>

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 T<sub>E</sub>X distribution (teT<sub>E</sub>X, miK<sub>T</sub>E<sub>X</sub>, ...) relies on file name databases, you must refresh these. For example, teT<sub>E</sub>X users run `texhash` or `mktextlsr`.

<sup>1</sup><http://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 `pdf $\LaTeX$` :

```
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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