

The `revtex4` document class of the American Physical Society

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This file embodies the implementation of the APS REVTeX 4 document class for electronic submissions to journals.

The distribution point for this work is <http://publish.aps.org/revtex4/>, which contains fully unpacked, prebuilt runtime files and documentation.

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1 Using REVTeX

The file `README` has retrieval and installation information.

User documentation is presented separately in `revguide.tex`.

The file `template.aps` is a boilerplate file.

2 Overview

REVTeX is a L^AT_EX 2_ε document class, somewhat like a hybrid of the standard L^AT_EX book and `article` classes.

Certain packages are (should be) loaded by this class in any case: `amssymb`, `amsmath`, `bm`, `natbib`.

Certain packages are automatically loaded by this class when a corresponding class option has been invoked:

REVTeX option	package
<code>amsfonts</code>	<code>amsfonts</code>
<code>amssymb</code>	<code>amssymb</code>
<code>aps</code>	<code>overcite</code>

Certain other packages are to be loaded by the document through explicit use of `\usepackage`. Some mentioned in the user documentation are `graphicx`, `longtable`, and `bm`.

Certain commonly used packages are known to be incompatible with REVTeX, among them `multicol` and `cite`. If such a package is found to be loaded, REVTeX issues an error message and halts the job. Halting might be considered severe punishment for loading an incompatible package, but if we were to proceed, an even weirder error might be encountered further down the road.

This document class implements the substyle: a set of mutually exclusive class options that, in this case, allow the document class to address multiple societies. It also implements a sub-substyle, giving the journal of the given society. The only society currently implemented is `aps`, however, code is in place for another society, the `osa`.

FIXME: should always load the `graphicx` package.

QUERY: since `amsfonts` and `amssymb` extend syntax, why not load them in any case?

QUERY: if you say `\documentclass[prb,osa]{revtex4}`, then the value of `\@society` will be wrong, or? Fixed.

Certain events occur at `\AtEndOfClass` time:

1. Optionally read in packages `amsfonts`, `amssymb`.
2. Read in society substyle `.rtx` file.
3. Read in type size `.rtx` file.
4. Read in the job's style file, the `.rty` file.
5. Define things based on `\secnumarabic@sw`.
6. Install procedures to execute at the very end of the class's `\AtBeginDocument` processing, such as
 - (a) closing out the page grid
 - (b) putting out the LastPage label.
 - (c) issuing a `\bibliographystyle` command, based on the value set by the society substyle.
 - (d) setting default values for parameters used in the document. **FIXME:** differentiate between class's parameters that can wait until they are used in the document, and parameters that are used at `\AtBeginDocument` time.
7. Install procedures to execute the very last at `\AtEndDocument` time, such as the `\clearpage` processing.

Certain events are optionally scheduled for `\AtBeginDocument` time:

1. Setting default values for the Booleans and for other procedures used in formatting.
2. In response to class options options, adjusting parameters and procedures used in formatting.
3. Implementing the `eqsecnum` option, if required.
4. Setting the state engine for data commands.
5. Memorizing procedures for later use.
6. Setting type size and area, for use by later calculations.

Certain events are scheduled for `\class@enddocumenthook` time:

1. Print out the migrated floats or the end notes, if needed.
2. Close out the page grid.
3. Label the last page of the document
4. (`natbib`) prepare to read in the `.aux` file.

3 The installer file

We include here a reference copy of the installer file, `revtex4.ins`. It is not intended that one actually generate that file using `docstrip` via the `revtex4` installer file, because that would involve overwriting the file that \TeX is typesetting. Instead, the installer file is provided pre-generated.

For the most part, the installer is simple: it generates `revtex4.cls` and a collection of `.rtx` files from `revtex4.dtx`.

However, the process of generating `revtex4.cls` involves the incorporation of portions of two of the `ltx` series of files, `ltxutil.dtx`, and `ltxgrid.dtx`. The former is a collection of macro definitions that serve as the lowest level of extensions to \LaTeX , the latter implements an alternative output routine and page gridding mechanism that provides for multicolumn page layouts, but without the sorry limitations of the \LaTeX required package, `multicol`, and is also compatible with the `longtable` package (which `multicol` is not).

```
1 %<*ins>
2 % This file requires docstrip version 2.4 or higher available from
3 % ftp://ctan.tug.org/tex-archive/macros/latex/unpacked/docstrip.tex
4 \input docstrip
5 \preamble
6
7 This file is part of the APS files in the REVTeX 4 distribution.
8 For the version number, search on the string %FileInfo
9
10 Copyright (c) 2000 The American Physical Society.
11 http://publish.aps.org/revtex4/
12 mailto:revtex@aps.org
13
14 Maintained by Arthur Ogawa (mailto:ogawa@teleport.com)
15 under contract to the American Physical Society.
16
17 See the REVTeX 4 README file for restrictions and more information.
18
19 \endpreamble
20 \keepsilent
21 \askforoverwritefalse
22 \generate{%
23   \file{revtex4.cls}{%
24     \from{revtex4.dtx}{class-pre}%
25     \from{ltxutil.dtx}{ltxutil-krn}%
26     \from{ltxgrid.dtx}{ltxgrid-krn}%
27     \from{textcase.dtx}{package}%
28     \from{revtex4.dtx}{class-pst}%
29   }%
30   \file{aps.rtx}{\from{revtex4.dtx}{aps}}%
31   \file{rmp.rtx}{\from{revtex4.dtx}{rmp}}%
32   \file{10pt.rtx}{\from{revtex4.dtx}{10pt}}%
33   \file{11pt.rtx}{\from{revtex4.dtx}{11pt}}%
```

```

34 \file{12pt.rtx}{\from{revtex4.dtx}{12pt}}%
35 \file{revsymb.sty}{\from{revtex4.dtx}{revsymb}}%
36 }%
37 \endbatchfile
38 %</ins>

```

4 Writing journal-specific extensions to REVTeX

With this version of REVTeX, we introduce a somewhat different scheme for adapting REVTeX to the needs of a specific journal.

To create a journal substyle, you create new class options in REVTeX for the society, say `osa`, and any of that society's journals, one of which is, say, `josaa`, using the code for the APS as a guide. In particular, each of your new options should separately define `\@society` and `\@journal`. That for the former will be the same for all options relating to a particular society.

Then, for the society, you create a corresponding `.rtx` file, in our case `osa.rtx`. Within that file, you override procedures and parameter assignments as you see fit. Ideally they will be generally applicable to all of that society's journals (see the file `aps.rtx` for a realization of this scheme). Also within that file, you include a section of code for each journal, that for `josaa` looks like:

```

% \@ifx{\@journal\journal@josaa}{%
% <code specific to the josaa>
% }{}%
%

```

Thus far, the scheme is similar to that used in REVTeX 3.1. However, the new scheme does differ from the old in that the `.rtx` file should define no syntactical extensions to REVTeX.

5 The revtex4 Document Class

```

39 %<*class-pre>
40 \def\class@name{revtex4}%
    Print a banner in the log:
41 \GenericInfo{}{\space
42 Copyright (c) 2001 The American Physical Society.^J
43 mailto:revtex@aps.org^J
44 Licensed under the LPPL:^Jhttp://www.ctan.org/tex-archive/macros/latex/base/lppl.txt^J
45 Arthur Ogawa <ogawa@teleport.com>^J
46 Based on work by David Carlisle <david@dcarlisle.demon.co.uk>%
47 \@gobble
48 }%

```

5.1 Compatability Processing

If the document has `\documentstyle{revtex4}`, then, instead of attempting to run in compatability mode, just complain and exit.


```

49 \ifcompatibility
50 \edef\reserved@a{\errhelp{%
51   Change your \string\documentstyle\space statement to
52   \string\documentclass\space and rerun.
53 }}\reserved@a
54 \errmessage{You cannot run \class@name\space in compatability mode}%
55 \expandafter\@end
56 \fi

```

6 Extensions to the L^AT_EX Kernel

I am introducing some portions of the `ltxkrnext` package (<ftp://ftp.teleport.com/users/ogawa/macros/latex/contrib/supported/ltxkrnext/>).

First, de-fang unwanted commands and turn `\ProvidesPackage` into an informative message.

```

57 \let\DeclareOption@latex\DeclareOption
58 \let\DeclareOption@gobbletwo
59 \let\ProcessOptions@latex\ProcessOptions
60 \let\ProcessOptions@empty
61 \let\ProvidesPackage@latex\ProvidesPackage
62 \def\ProvidesPackage#1[#2]{%
63   \class@info{Incorporating package #1 [#2].}%
64 }%
65 %</class-pre>

```

Now load the utility and page grid packages. The `ltxutil` and `ltxgrid` packages are distributed with REV_TE_X.

```

66 %\RequirePackage{ltxutil}%
67 %\RequirePackage{ltxgrid}%

```

The `textcase` package is available from <CTAN:/macros/latex/contrib/supported/carlisle/textcase.dtx> and is used at the suggestion, and by permission, of David P. Carlisle.

```

\ProvidesFiletextcase.dtx [1998/11/12 v0.06 Text only upper/lower
case changing (DPC)]

```

David, in turn, suggests that Donald Arseneau be credited for some of the ideas in the `textcase` package, so let it hereby be so understood.

Note that David's package has a bug, which is fixed as follows: Change:

```

%   \def\NoCaseChange##1{\noexpand\NoCaseChange{\noexpand##1}}
%

```

To:

```

%   \def\NoCaseChange##1{\noexpand\NoCaseChange{\noexpand##1}}%
%

```

```

68 %\RequirePackage{textcase}%

```

Next, restore those cammands we de-fanged:

```
69 %<class-pst>
70 \let\ProvidesPackage\ProvidesPackage@latex
71 \let\ProcessOptions\ProcessOptions@latex
72 \let\DeclareOption\DeclareOption@latex
```

And let the `textcase` commands override those of L^AT_EX:

```
73 \expandafter
74 \let\csname MakeUppercase \expandafter\endcsname
75   \csname MakeTextUppercase \endcsname
76 \expandafter
77 \let\csname MakeLowercase \expandafter\endcsname
78   \csname MakeTextLowercase \endcsname
```

Try to patch `longtable`.

```
79 \appdef\class@documenthook{%
80   \switch@longtable
81 }%
```

Try to provide a more robust version of `\boldmath`. If Team L^AT_EX ever gets around to fixing this problem, we will bow out. (This relates to bug #394.)

```
82 \appdef\class@documenthook{%
83   \expandafter\@ifnotrelax\csname boldmath \endcsname{}-%
84   \expandafter\let\csname boldmath \endcsname\boldmath
85   \expandafter\def\expandafter\boldmath\expandafter{\expandafter\protect\csname boldmath \endcsname}
86 }%
87 }%
```

7 Options

7.1 Define Booleans Used in Options

The following Booleans are used within the document class to allow the document or the substyle to make selections of formatting. Because an explicit document class option always overrides a substyle, any substyle wishing to assign a value to a flag must first test the flag to confirm that it is still undefined. This further means that the default value of the flag must be assigned late, at the end of `\AtBeginDocument` time, and that the flag may be queried no earlier than that time.

`\class@inithook` The hook `\class@inithook` is installed into `\class@documenthook`, and thereafter serves as the focal point for all code that gives default values to the class's parameters.

A typical code might be:

```
%\appdef\class@inithook{%
% \@ifxundefined\twocolumn@sw{\@booleanfalse\twocolumn@sw}{}%
}%%
%
```

which ensures that the switch `\twocolumn@sw` is never left undefined.

```
88 \appdef\class@documenthook{%
89 \class@inithook
90 }%
91 \def\class@inithook{}%
92 %
```

`\twocolumn@sw` The boolean `\twocolumn@sw` signifies that we are to use a two-column grid.

```
93 \appdef\class@inithook{%
94 \@ifxundefined\twocolumn@sw{\@booleanfalse\twocolumn@sw}{}%
95 }%
```

`\footinbib@sw` The boolean `\footinbib@sw` signifies that footnotes are to be set in the bibliography, as endnotes.

```
96 \appdef\class@inithook{%
97 \@ifxundefined\footinbib@sw{\@booleanfalse\footinbib@sw}{}%
98 }%
```

`\preprintsty@sw` The boolean `\preprintsty@sw` signifies that the document is to be formatted in preprint style.

```
99 \appdef\class@inithook{%
100 \@ifxundefined\preprintsty@sw{\@booleanfalse\preprintsty@sw}{}%
101 }%
```

`\preprint@sw` The boolean `\preprint@sw` signifies that the preprints (cf. `\preprint`) are to be formatted (usually on the title page). The default is to do so; the option `nopreprintnumbers` declares not to.

```
102 \appdef\class@inithook{%
103 \@ifxundefined\preprint@sw{\@booleanfalse\preprint@sw}{}%
104 \preprintsty@sw{\@booleantrue\preprint@sw}{}%
105 }%
```

`\galley@sw` The boolean `\galley@sw` signifies that the document is to be formatted in galley style.

Asserting both `\galley@sw` and `\preprintsty@sw` may produce strange formatting results, but it is not illegal. However, it *is* illegal to assert galley and any `twocolumn` option.

```
106 \appdef\class@inithook{%
107 \@ifxundefined\galley@sw{\@booleanfalse\galley@sw}{}%
108 }%
```

`\groupauthors@sw` The flag `\groupauthors@sw` signifies that authors are to be grouped. This affects the meaning of `\@author@present` and `\@tempaffil`.

FIXME: apparently `\@tempaffil` and its aliases are never used.

`\runinaddress@sw` The flag `\runinaddress@sw` signifies that author addresses are to be run in.

`\@affils@sw` If `\@affils@sw` is false, an address is never recognised as “new” and is therefore always entered into the affiliation list, stopping groups of authors at the same address being amalgamated into the same list: the address will be printed the same number of times it is entered.

`\showPACS@sw` If `\showPACS@sw` is true, print the PACS information in the title block, otherwise
`\showKEYS@sw` not. Similarly for `\showKEYS@sw` and the keywords.

```

109 \appdef\class@inithook{%
110 \@ifxundefined\showPACS@sw{\@booleanfalse\showPACS@sw}{}%
111 \@ifxundefined\showKEYS@sw{\@booleanfalse\showKEYS@sw}{}%
112 }%
```

`\floats@sw` The Boolean `\floats@sw` signifies that floats are to be floated; if false, that floats are to be deferred to the end of the document. By default, the former. Note that the state of this Boolean is to be changed by the document class in response to user-selected options.

This boolean and the assignment of its default value is done by the `ltxutil` package.

`\floatp@sw` The Boolean `\floatp@sw` signifies that endfloats are to be set one per page; if false, that endfloats are to be set with multiple floats per page permitted. By default, the latter. Note that the state of this Boolean is to be changed by the document class in response to user-selected options. The default is established here.

`\twoside@sw` The flag `\twoside@sw` signifies that the document is to be formatted for duplex printing. At `\AtBeginDocument` time, we must align the value of the kernel `\newif` switch `\if@twoside` to that of `\twoside@sw`.

```

113 \appdef\class@inithook{%
114 \@ifxundefined\twoside@sw{\@booleanfalse\twoside@sw}{}%
115 \twoside@sw{\@twosidettrue}{\@twosidefalse}%
116 }%
```

`\draft@sw` The flag `\draft@sw` signifies that the document is to be formatted in draft mode. Certain packages may pay attention to the class option `draft` that sets this Boolean.

```

117 \appdef\class@inithook{%
118 \@ifxundefined\draft@sw{\@booleanfalse\draft@sw}{}%
119 \draft@sw{\overfullrule 5\p@}{\overfullrule\z@}%
120 }%
```

`\tightenlines@sw` The boolean `\tightenlines@sw` signifies that the leading is to be made standard amount. If false, it means that the leading is to be set extra open. Has no effect on 10pt size option.

```

121 \appdef\class@inithook{%
122 \@ifxundefined\tightenlines@sw{\@booleanfalse\tightenlines@sw}{}%
123 }%
```

`\lengthcheck@sw` The flag `\lengthcheck@sw` signifies that the length checking is in effect. It is up to the individual journal substyle to alter its formatting accordingly.

```
124 \appdef\class@inithook{%
125 \@ifxundefined\lengthcheck@sw{\@booleanfalse\lengthcheck@sw}{}%
126 }%
```

`\eqsecnum@sw` The flag `\eqsecnum@sw` signifies that equations are to be numbered with the section, e.g., “Eq. (2.13)”. This flag is neither set nor queried.

```
127 \appdef\class@inithook{%
128 \@ifxundefined\eqsecnum@sw{\@booleanfalse\eqsecnum@sw}{}%
129 \eqsecnum@sw{%
130 \@addtoreset{equation}{section}%
131 \def\theequation@prefix{\arabic{section}.}%
132 }{}%
133 }%
```

`\byrevtex@sw` The flag `\byrevtex@sw` signifies that the document should bear an imprint to the effect that it was formatted by this document class.

```
134 \appdef\class@inithook{%
135 \@ifxundefined\byrevtex@sw{\@booleanfalse\byrevtex@sw}{}%
136 }%
```

7.2 Declare Options

7.2.1 Checkin: for Editorial Use

A document class option declaring that the document is being processed by the editorial staff.

This option should:

- put date in footer along with folio
- Have the effect of selecting the `preprint` class option.
- Have the effect of selecting the `showpacs` class option.
- specify that when a float is placed `h` or `H`, it will be allowed to break over pages. (Note: be sure that if the enclosed `tabular` has an optional argument, you change it to `[v]`, or remove it entirely.)

```
137 \DeclareOption{checkin}{%
138 \@booleantrue\dateinRH@sw
139 \@booleantrue\preprintsty@sw
140 \def\@pointsize{12}%
141 \@booleantrue\showPACS@sw
142 \@booleantrue\showKEYS@sw
143 \def\fp@proc@h{\allow@breaking@tables}%
144 \def\fp@proc@H{\allow@breaking@tables}%
145 }%
146 \@booleanfalse\dateinRH@sw
```

```

147 \def\checkindate{\dateinRH@sw{\tiny(\today)}}{}%
148 \def\allow@breaking@tables{%
149 \def\array@default{v}% tabular can break over pages
150 \@booleanfalse\floats@sw % table can break over pages
151 }%

```

7.2.2 Preprint Style

```

152 \DeclareOption{preprint}{%
153 \@booleantrue\preprintsty@sw
154 \def\@pointsize{12}%
155 }%
156 \DeclareOption{manuscript}{%
157 \class@warn{Document class option manuscript is obsolete; use preprint instead}%
158 \ExecuteOptions{preprint}%
159 }%

```

7.2.3 Showing PACS and keywords

```

160 \DeclareOption{showpacs}{%
161 \@booleantrue\showPACS@sw
162 }%
163 \DeclareOption{noshowpacs}{%
164 \@booleanfalse\showPACS@sw
165 }%
166 \DeclareOption{showkeys}{%
167 \@booleantrue\showKEYS@sw
168 }%
169 \DeclareOption{noshowkeys}{%
170 \@booleanfalse\showKEYS@sw
171 }%

```

7.2.4 Balance the last page when in two-column page grid

If we are in a two-column page grid, we may wish to balance the columns of the last page. This will be done automatically if the `twocolumn` document class option is chosen. This action will be turned off by the `nobalancelastpage`. A complementary class option, `balancelastpage` is also provided.

```

172 \DeclareOption{balancelastpage}{%
173 \@booleantrue\balancelastpage@sw
174 }%
175 \DeclareOption{nobalancelastpage}{%
176 \@booleanfalse\balancelastpage@sw
177 }%
178 \appdef\class@inithook{%
179 \@ifxundefined\balancelastpage@sw{%
180 \@booleantrue\balancelastpage@sw
181 }{}%
182 }%

```

7.2.5 Showing preprint numbers

```
183 \DeclareOption{nopreprintnumbers}{\@booleanfalse\preprint@sw}%
184 \DeclareOption{preprintnumbers}{\@booleantrue\preprint@sw}%
```

7.2.6 Hypertext Option

```
185 \DeclareOption{hyperref}{%
186 %\AtEndOfClass{%
187 % \begingroup
188 % \edef\@tempa{%
189 % \let
190 % \noexpand\@clsextension
191 % \noexpand\@empty
192 % \noexpand\RequirePackage{hyperref}%
193 % \def\noexpand
194 % \@clsextension{\@clsextension}%
195 % }%
196 % \expandafter
197 % \endgroup
198 % \@tempa
199 %}%
```

If you have a hyper-foo enabled browser you may prefer this format which does not print the URL for the home page, but just makes the name a link, but by default print it so it works on paper.

```
200 % \def\@pointsize{10}%
201 \class@warn{Class option "hyperref" is no longer supported.^^JEmploy \string\usepackage{hyperr
202 }%
```

7.2.7 Type Size

Use \@pointsize=10 rather than \@ptsize=0 to allow easy extensions to 9pt or whatever. Note: the three alternatives are mutually exclusive. Furthermore if \@pointsize is still undefined at \@AtEndOfClass time, then the substyle can conclude that the user accepts the default.

```
203 \DeclareOption{10pt}{\def\@pointsize{10}}
204 \DeclareOption{11pt}{\def\@pointsize{11}}
205 \DeclareOption{12pt}{\def\@pointsize{12}}
```

7.2.8 Media Size

```
206 \DeclareOption{a4paper}
207   {\setlength\paperheight {297mm}%
208    \setlength\paperwidth  {210mm}}
209 \DeclareOption{a5paper}
210   {\setlength\paperheight {210mm}%
211    \setlength\paperwidth  {148mm}}
212 \DeclareOption{b5paper}
213   {\setlength\paperheight {250mm}%
214    \setlength\paperwidth  {176mm}}
215 \DeclareOption{letterpaper}
```

```

216   {\setlength\paperheight {11in}%
217     \setlength\paperwidth {8.5in}}
218 \DeclareOption{legalpaper}
219   {\setlength\paperheight {14in}%
220     \setlength\paperwidth {8.5in}}
221 \DeclareOption{executivepaper}
222   {\setlength\paperheight {10.5in}%
223     \setlength\paperwidth {7.25in}}
224 \DeclareOption{landscape}
225   {\setlength\@tempdima {\paperheight}%
226     \setlength\paperheight {\paperwidth}%
227     \setlength\paperwidth {\@tempdima}}

```

7.2.9 Bibnotes

Frontmatter footnotes result from frontmatter commands like `\email`, `\homepage`, `\altaffiliation`, and `\thanks`. The default for `\frontmatter@footnote@produce` is `\frontmatter@footnote@produce@footnote`, which formats the frontmatter footnotes at the foot of the title page. The `bibnotes` class option defers them to the bibliography.

```

228 \DeclareOption{bibnotes}{\@booleantrue\bibnotes@sw}%
229 \DeclareOption{nobibnotes}{\@booleanfalse\bibnotes@sw}%
230 \appdef\class@enddocumenthook{\auto@bib}%
231 \appdef\class@inithook{%
232   \@ifxundefined\bibnotes@sw{\@booleanfalse\bibnotes@sw}{}%
233   \bibnotes@sw{%
234     \let\frontmatter@footnote@produce\frontmatter@footnote@produce@endnote
235   }{%
236     \let\frontmatter@footnote@produce\frontmatter@footnote@produce@footnote
237   }%
238 }%

```

7.2.10 Footinbib

```

239 \DeclareOption{footinbib}{\@booleantrue\footinbib@sw}
240 \DeclareOption{nofootinbib}{\@booleanfalse\footinbib@sw}

```

7.2.11 altaffilletter

```

241 \DeclareOption{altaffilletter}{\@booleantrue\altaffilletter@sw}%
242 \DeclareOption{altaffilsymbol}{\@booleanfalse\altaffilletter@sw}%
243 \appdef\class@inithook{%
244   \@ifxundefined\altaffilletter@sw{\@booleanfalse\altaffilletter@sw}{}%
245 }%

```

7.2.12 superbib

The document may invoke superscript bibliography style. If not, the journal sub-style may make a selection. If neither, the class itself selects a default. This is really a quite deep nesting of defaults.

```

246 \DeclareOption{superbib}{%

```



```

247 \def\place@bibnumber{\place@bibnumber@sup}%
248 }%

```

7.2.13 citeautoscript

This class option allows you to automatically accomodate a change from non-superscripted, numbered references to superscripted, bunnbered references.

Note: you should always mark up your document with the assumption that references are *not* going to be superscripted. Otherwise this option has no hope of working properly.

```

249 \DeclareOption{citeautoscript}{%
250 \@booleantrue\citeautoscript@sw
251 }%
252 \@booleanfalse\citeautoscript@sw

```

7.2.14 Simplex/Duplex Pages

The complementary options `twoside` and `oneside` assert formatting for duplex or simplex printing, respectively. At the same time, we arrange for the selection of the page grid with respect to the marginal column: Because `\if@reversemargin` remains default (false), if duplex printing, this column will always be on the (right), if simplex printing, it will always be on the (outside). QUERY: correct choice?

```

253 \DeclareOption{twoside}{\@booleantrue\twoside@sw \mparswitchfalse}
254 \DeclareOption{oneside}{\@booleanfalse\twoside@sw\mparswitchtrue}

```

7.2.15 Two-Column Page Grid

`\twocolumn@sw` The flag `\twocolumn@sw` signifies that the document is to be formatted in the two-column page grid.

If no options relating to page grid are invoked by `\AtBeginDcoument` time, we set default values. Up to that point, the class can check if `\twocolumn@sw` is `\undefined` to see if any related options have been invoked.

At `\AtBeginDocument` time, we must align the value of the kernel `\newif` switch `\if@twocolumn` to that of `\twocolumn@sw`.

We install into `\class@enddocumenthook` all tasks that we know must be completed at `\AtEndDocument` time. The first thing it does is end the current paragraph. The last is to return us to one-column page grid. (This task is installed as late as possible, i.e., after items like `\printtables`.)

```

255 \AtEndOfClass{%
256 \def\clear@document{%
257 \close@column
258 }%
259 \appdef\class@inithook{%
260 \@ifxundefined\close@column{%
261 \let\close@column\close@column@default
262 }{}%
263 }%

```

```
264 }%
```

The `twocolumn` class option employs the standard mechanism for changing the column grid: the `ltxgrid` package.

```
265 \DeclareOption{twocolumn}{%
266   \@booleantrue\twocolumn@sw
267 }%
```

`onecolumn` specifies one-column page grid.

```
268 \DeclareOption{onecolumn}{%
269   \@booleanfalse\twocolumn@sw
270 }%
```

`galley` emulates setting the galley of a two-column journal. **FIXME:** this option should effectively set `\preprintsty@sw` false. **NOTE:** it makes no sense to assert both `galley` and `twocolumn`.

```
271 \DeclareOption{galley}{%
272   \ExecuteOptions{onecolumn}%
273   \@booleantrue\galley@sw
274   \appdef\set@pica@hook{%
275     \advance\textwidth-\columnsep
276     \textwidth.5\textwidth
277   }%
278 }%
```

7.2.16 raggedbottom or flushbottom

The class options `raggedbottom` and `flushbottom` determine whether the columns (page) are ragged bottom or flush bottom. Note that we do not select a default here; that is done by the journal substyle.

```
279 \DeclareOption{raggedbottom}{\@booleantrue\raggedcolumn@sw}
280 \DeclareOption{flushbottom}{\@booleanfalse\raggedcolumn@sw}
```

7.2.17 tightenlines

This class option specifies that standard leading is to be used to set the type. If lacking, the leading will be loose.

```
281 \DeclareOption{tightenlines}{\@booleantrue\tightenlines@sw}
```

7.2.18 lengthcheck

This class option specifies that the formatted document should approach as closely as possible the formatting of an actual journal article to facilitate the author's performance of a length check.

```
282 \DeclareOption{lengthcheck}{%
283   \@booleantrue\lengthcheck@sw
284   \@booleantrue\twoside@sw
285   \@booleantrue\twocolumn@sw
286 }%
```

7.2.19 Draft and Final

```
287 \DeclareOption{draft}{%
288 \@booleantrue\draft@sw
289 }%
290 \DeclareOption{final}{%
291 \@booleanfalse\draft@sw
292 }%
```

7.2.20 eqsecnum

The `eqsecnum` class option signifies that equations are to be numbered within sections.

```
293 \DeclareOption{eqsecnum}{\@booleantrue\eqsecnum@sw}
```

7.2.21 secnumarabic

The `secnumarabic` class option signifies that sectioning commands are to be numbered arabic.

```
294 \DeclareOption{secnumarabic}{\@booleantrue\secnumarabic@sw}
```

The code that polls the Boolean `\secnumarabic@sw` appears in Section 22.2.

FIXME: model `fleqn` after `amsfonts`. I no longer understand why I said this.

```
295 \DeclareOption{fleqn}{\input{fleqn.clo}}
```

7.2.22 floats/endfloats

These options control, via the Boolean `\floats@sw`, whether floats are to be migrated to the end of the document.

```
296 \DeclareOption{floats}{\@booleantrue\floats@sw\@booleanfalse\floatp@sw}
297 \DeclareOption{endfloats}{\@booleanfalse\floats@sw\@booleanfalse\floatp@sw}
298 \DeclareOption{endfloats*}{\@booleanfalse\floats@sw\@booleantrue\floatp@sw}
299 \appdef\class@inithook{%
300 \@ifxundefined\floats@sw{\@booleantrue\floats@sw}{}%
301 \@ifxundefined\floatp@sw{\@booleantrue\floatp@sw}{}%
302 }%
```

7.2.23 titlepage/notitlepage

These options control, via `\titlepage@sw`, whether the title block is to be set on a separate page.

`\titlepage@sw` The flag `\titlepage@sw` signifies that a forced page break is to follow the title page: the article title appears on a page by itself.

The Boolean `\titlepage@sw` is in an odd situation: its value is set by one or more substyles, contingent upon the value of another Boolean. Therefore that code must be invoked at `\AtBeginDocument` time. Therefore we must assign the default value at the very end of `\AtBeginDocument` processing: we use `\defaults@hook`. Luckily, this Boolean does not need to be queried at `\AtBeginDocument` time, or we'd be in dire straights.

```

303 \DeclareOption{titlepage}{\@booleantrue\titlepage@sw}
304 \DeclareOption{notitlepage}{\@booleanfalse\titlepage@sw}
305 \appdef\defaults@hook{%
306   \ifxundefined\titlepage@sw{\@booleanfalse\titlepage@sw}{}%
307 }%

```

7.2.24 Substyle and Sub-substyle

If the society has already been assigned, notify user that `\@society` is being overridden.

```

308 \def\change@society#1{%
309   \def\@tempa{#1}%
310   \ifxundefined\@society{}{%
311     \ifx{\@tempa\@society}{}{%
312       \class@warn{Conflicting society \@tempa<>\@society.}%
313     }%
314   }%
315   \let\@society\@tempa
316 }%

```

Here are the class options relating to the APS

```

317 \DeclareOption{aps}{\change@society{aps}\def\@journal{}}%
318 \DeclareOption{pra}{\change@society{aps}\def\@journal{pra}}%
319 \DeclareOption{prb}{\change@society{aps}\def\@journal{prb}}%
320 \DeclareOption{prc}{\change@society{aps}\def\@journal{prc}}%
321 \DeclareOption{prd}{\change@society{aps}\def\@journal{prd}}%
322 \DeclareOption{pre}{\change@society{aps}\def\@journal{pre}}%
323 \DeclareOption{prl}{\change@society{aps}\def\@journal{prl}}%
324 \DeclareOption{prstab}{\change@society{aps}\def\@journal{prstab}}%
325 \DeclareOption{rmp}{\change@society{aps}\def\@journal{rmp}}%

```

Here are the class options relating to the Optical Society of America

```

326 \DeclareOption{osa}{\change@society{osa}\def\@journal{}}%
327 \DeclareOption{osameet}{\change@society{osa}\def\@journal{osameet}}%
328 \DeclareOption{opex}{\change@society{osa}\def\@journal{opex}}%
329 \DeclareOption{tops}{\change@society{osa}\def\@journal{tops}}%
330 \DeclareOption{josa}{\change@society{osa}\def\@journal{josa}}%

```

NOTE: `revguide.tex` does not mention any `\@journal` options besides `prb`.

amsfonts The class option `amsfonts` has the same effect as if the document preamble contained a `\usepackage{amsfonts}` statement.

```

331 \DeclareOption{amsfonts}{%
332   \def\class@amsfonts{\RequirePackage{amsfonts}}%
333 }%
334 \DeclareOption{noamsfonts}{%
335   \let\class@amsfonts\@empty
336 }%
337 \AtEndOfClass{%
338   \ifxundefined\class@amsfonts{\class@amsfonts}%
339 }%

```

amssymb The class option `amssymb` has the same effect as if the document preamble contained a `\usepackage{amssymb}` statement.

```
340 \DeclareOption{amssymb}{%
341   \def\class@amssymb{\RequirePackage{amssymb}}%
342 }%
343 \DeclareOption{noamssymb}{%
344   \let\class@amssymb\@empty
345 }%
346 \AtEndOfClass{%
347   \@ifundefined\class@amssymb{\class@amssymb}%
348 }%
```

amsmath The class option `amsmath` has the same effect as if the document preamble contained a `\usepackage{amsmath}` statement.

We require version 1.2 (dated 1997/03/20) or later. The `\ver@amsmath.sty`, will

\LaTeX note: Certain \LaTeX procedures have an arbitrary and pointless restriction that they may be used only within the preamble. We get around this by preserving the procedures in private `\csnames`.

FIXME note: it is difficult to ensure that an error summary will be printed on the console at the very end, but `ltxgrid` allows accomplishing this via an interrupt, put down at `\AtEndDocument` time.

```
349 \DeclareOption{amsmath}{%
350   \def\class@amsmath{\RequirePackage{amsmath}[\ver@amsmath@prefer]}%
351 }%
352 \DeclareOption{noamsmath}{%
353   \let\class@amsmath\@empty
354 }%
355 \AtEndOfClass{%
356   \preserve@LaTeX
357   \@ifundefined\class@amsmath{\class@amsmath}%
358   \appdef\class@enddocumenthook{\test@amsmath@ver}%
359 }%
360 \appdef\preserve@LaTeX{%
361   \let\@ifl@aded@LaTeX\@ifl@aded
362   \let\@ifpackageloaded@LaTeX\@ifpackageloaded
363   \let\@pkgextension@LaTeX\@pkgextension
364   \let\@ifpackagelater@LaTeX\@ifpackagelater
365   \let\@ifl@ter@LaTeX\@ifl@ter
366   \let\@ifl@t@r@LaTeX\@ifl@t@r
367   \let\@parse@version@LaTeX\@parse@version
368 }%
369 \appdef\restore@LaTeX{%
370   \let\@ifl@aded\@ifl@aded@LaTeX
371   \let\@ifpackageloaded\@ifpackageloaded@LaTeX
372   \let\@pkgextension\@pkgextension@LaTeX
373   \let\@ifpackagelater\@ifpackagelater@LaTeX
374   \let\@ifl@ter\@ifl@ter@LaTeX
```

```

375 \let@ifl@t@r@ifl@t@r@LaTeX
376 \let@parse@version@parse@version@LaTeX
377 }%
378 \def\test@amsmath@ver{%
379 \begingroup
380 \restore@LaTeX
381 \@ifpackageloaded{amsmath}{%
382 \@ifpackagelater{amsmath}{\ver@amsmath@prefer}{}%
383 \class@warn{%
384     You have loaded amsmath, version "\csname ver@amsmath.sty\endcsname",\MessageBreak
385     but this class requires version "\ver@amsmath@prefer", or later.\MessageBreak
386     Please update your LaTeX installation.
387 }%
388 }%
389 }-%
390 }%
391 \endgroup
392 }%
393 \def\ver@amsmath@prefer{2000/01/15 v2.05 AMS math features}%

```

7.2.25 Presenting Authors and Their Affiliations

The `runinaddress` option is the only one that sets `\runinaddress@sw` to true.

The `unsortedaddress` option is the only one that sets `\@affils@sw` to false.

If we take the `groupedaddress` option as the default, then we can look upon the `superscriptaddress` option as simply turning `\groupauthors@sw` to false.

`groupedaddress`, the default, groups authors above a common address. In order to assert the default and still provide for proper precedence for document-supplied options, we carry out our action at `\AtBeginDocument` time, and only if none of the related class options were invoked.

```

394 \DeclareOption{groupedaddress}{\clo@groupedaddress}%
395 \def\clo@groupedaddress{%
396 \@booleantrue\groupauthors@sw
397 \@booleantrue\@affils@sw
398 \@booleanfalse\runinaddress@sw
399 }%
400 \appdef\class@inithook{%
401 \@ifxundefined\groupauthors@sw{\clo@groupedaddress}{}%
402 }%

```

`unsortedaddress` is similar to `groupedaddress`, but turns off `\@affils@sw`, with the result that each address that is entered will be printed.

```

403 \DeclareOption{unsortedaddress}{\clo@unsortedaddress}%
404 \def\clo@unsortedaddress{%
405 \@booleantrue\groupauthors@sw
406 \@booleanfalse\@affils@sw
407 \@booleanfalse\runinaddress@sw
408 }%

```

`runinaddress` is similar to `groupedaddress`, with the addition of the Boolean `\runinaddress@sw`, which causes the authors associated with a particular address group to be formatted in a paragraph instead of on separate lines.

```
409 \DeclareOption{runinaddress}{\clo@runinaddress}%
410 \def\clo@runinaddress{%
411   \@booleantrue\groupauthors@sw
412   \@booleantrue\@affils@sw
413   \@booleantrue\runinaddress@sw
414 }%
```

`superscriptaddress` presents author affiliations as superscripts. Authors with like affiliations share the same superscript.

FIXME: if `\groupauthors@sw` is false, would not `\@affils@sw` be a don't care?

```
415 \DeclareOption{superscriptaddress}{\clo@superscriptaddress}%
416 \def\clo@superscriptaddress{%
417   \@booleanfalse\groupauthors@sw
418   \@booleantrue\@affils@sw
419   \@booleanfalse\runinaddress@sw
420 }%
```

7.2.26 Typeset by REVTeX

The class option `byrevtex` signifies that you want the “Typeset by REVTeX” byline to appear on your formatted output. By default, no such byline appears.

```
421 \DeclareOption{byrevtex}{\@booleantrue\byrevtex@sw}%
```

7.3 Attempt to fix float placement failure

REVTeX uses the `ltxgrid` package, which provides the ability to attempt repairs when L^AT_EX’s float placement mechanism is about to fail, but that facility is turned off by default. Users should invoke the `floatfix` document class option to enable this L^AT_EX extension. If not, a helpful message is printed in the log, indicating how to work around the difficulty.

```
422 \DeclareOption{floatfix}{\@booleantrue\force@deferlist@sw}%
423 \DeclareOption{nofloatfix}{\@booleanfalse\force@deferlist@sw}%
424 \appdef\class@inithook{%
425   \@ifundefined\force@deferlist@sw{\@booleanfalse\force@deferlist@sw}{}%
426 }%
```

`\@fltovf` The L^AT_EX kernel error message `\@fltovf` may now be a bit more helpful to the `\@fltstk` user; likewise for the `\@fltstk` message of `ltxgrid`.

```
427 \gdef\@fltovf{%
428   \@latex@error{%
429     Too many unprocessed floats%
430     \force@deferlist@sw}{; try class option [floatfix]}%
431   }\@ehb
432 }%
433 \def\@fltstk{%
```

```

434 \@latex@warning{%
435   A float is stuck (cannot be placed)%
436   \force@deferlist@sw}{; try class option [floatfix]}%
437 }%
438 }%

```

`\ltxgrid@info@sw` The two options `ltxgridinfo` and `outputdebug` turn on informative diagnostics within the package `ltxgrid`. Only people who really want to see this output will select these class options. Consult documentation for the `ltxgrid` package to see what output the related switches enable.

```

439 \DeclareOption{ltxgridinfo}{\@booleantrue\ltxgrid@info@sw}%
440 \DeclareOption{outputdebug}{\@booleantrue\outputdebug@sw}%

```

7.4 Option to relax page height

The `ltxgrid` package can set text pages to their natural height or force them to the full text height; the latter is the default. If setting the pages with a variable length, the running foot will move up or down with the natural length of the text column. While I recommend against doing so, this option will turn that switch to the latter setting.

```

441 \DeclareOption{raggedfooter}{\@booleanfalse\textheight@sw}%
442 \DeclareOption{noraggedfooter}{\@booleantrue\textheight@sw}%

```

7.5 Selecting procedure for processing abstract

There are two different procedures for processing an abstract; the options `newabstract` and `oldabstract` determine which one the user prefers. At present, the default is to use the old, but this may change.

```

443 \DeclareOption{newabstract}{\@booleanfalse\oldabstract@sw}%
444 \DeclareOption{oldabstract}{\@booleantrue \oldabstract@sw}%
445 \appdef\class@inithook{%
446   \@ifxundefined\oldabstract@sw{\@booleanfalse\oldabstract@sw}{}%
447   \oldabstract@sw{%
448     \let@environment{abstract}{abstract-old}%
449   }{}%
450 }%

```

7.6 Default Option

The default handling for a document class option is to treat it as the name of a society and hunt for a corresponding `.rtx` file to read in. This behavior is much like the $\text{\LaTeX}2.09$ handling, where one looked for a `.sty` file, except that in this case, we must catch the case where multiple unknown options are declared.

```

451 \DeclareOption*{%
452   \IfFileExists{\CurrentOption\substyle@ext}{%
453     \expandafter\change@society\expandafter{\CurrentOption}%
454   }{}%

```



```

455 \OptionNotUsed
456 }%
457 }%
458 \def\substyle@ext{.rtx}%
459 \AtEndOfClass{%
460 \@ifxundefined\@society{%
461 \class@warn{No Society specified, using generic APS style}%
462 \def\@society{aps}\def\@journal{}}%
463 }{}%
464 \expandafter\input\expandafter{\@society\substyle@ext}%
465 }%

```

7.7 Class-Asserted Options

Here we establish the default document class options. Those of the document itself will override these.

```
466 \ExecuteOptions{10pt}
```

7.8 Execute Options

The document class options are processed in the order they are declared in this document class file.

Precedence is established in the following way:

First, the single `.rtx` file is read in. It may set values to any of the Booleans that represent class options, and it may elect to do so only if that Boolean is undefined, signifying that its corresponding document class options were absent from the document's option list. In this way correct precedence of class options is maintained.

Second, the type size option is acted upon. Type size code should not require altering the values of any of the Booleans carrying class options.

Next, at `\AtEndOfClass` time, certain packages are read in.

Finally, at `\AtBeginDocument` time, the state of the Booleans determines how the formatting will go.

```
467 \ProcessOptions\relax
```

8 Procedures Dependent Upon Options

Here we introduce `classes.dtx` definitions for the page styles that people will expect to be able to use.

```

\ps@headings
\ps@myheadings 468 \def\ps@headings{%
469 \let\@oddfoot\@empty\let\@evenfoot\@empty
470 \def\@evenhead{\thepage\hfil\slshape\leftmark}%
471 \def\@oddhead{\slshape\rightmark}\hfil\thepage}%
472 \let\@mkboth\markboth

```

```

473 \def\sectionmark##1{%
474 \markboth {\MakeUppercase{%
475 \ifnum \c@secnumdepth >\z@
476 \thesection\quad
477 \fi
478 ##1}}{}}%
479 \def\subsectionmark##1{%
480 \markright {%
481 \ifnum \c@secnumdepth >\@ne
482 \thesubsection\quad
483 \fi
484 ##1}}}%
485 \def\ps@myheadings{%
486 \let\@oddfoot\@empty\let\@evenfoot\@empty
487 \def\@evenhead{\thepage\hfil\slshape\leftmark}%
488 \def\@oddhead{\slshape\rightmark}\hfil\thepage}%
489 \let\@mkboth\@gobbletwo
490 \let\sectionmark\@gobble
491 \let\subsectionmark\@gobble
492 }%

\ps@article@twoside
\ps@article@oneside
\ps@preprint
493 \def\ps@article{%
494 \@provide\@evenhead{\let\\heading@cr\thepage\quad\checkindate\hfil{\leftmark}}%
495 \@provide\@oddhead{\let\\heading@cr{\rightmark}\hfil\checkindate\quad\thepage}%
496 \@provide\@oddfoot{}%
497 \@provide\@evenfoot{}%
498 \let\@mkboth\markboth
499 \let\sectionmark\@gobble
500 \let\subsectionmark\@gobble
501 }%
502 \def\ps@article@final{%
503 \@provide\@evenhead{\let\\heading@cr\thepage\quad\checkindate\hfil{\leftmark}}%
504 \@provide\@oddhead{\let\\heading@cr{\rightmark}\hfil\checkindate\quad\thepage}%
505 \@provide\@oddfoot{}%
506 \@provide\@evenfoot{}%
507 \let\@mkboth\markboth
508 \def\sectionmark##1{%
509 \markboth{%
510 \MakeTextUppercase{%
511 \@ifnum{\c@secnumdepth >\z@}{\thesection\hskip 1em\relax}{}}%
512 ##1%
513 }%
514 }{}}%
515 }%
516 \def\subsectionmark##1{%
517 \markright {%
518 \@ifnum{\c@secnumdepth >\@ne}{\thesubsection\hskip 1em\relax}{}}%
519 ##1%
520 }%

```

```

521   }%
522 }%
523 \appdef\class@inithook{%
524 %\twoside@sw{%
525 %}{%
526 }}%
527 }%

528 \def\heading@cr{\unskip\space\ignorespaces}%

529 \def\ps@preprint{%
530 \@provide\@oddfoot{\hfil\thepage\quad\checkindate\hfil}%
531 \@provide\@evenfoot{\hfil\thepage\quad\checkindate\hfil}%
532 \@provide\@oddhead{}%
533 \@provide\@evenhead{}%
534 \let\@mkboth\@gobbletwo
535 \let\sectionmark\@gobble
536 \let\subsectionmark\@gobble
537 }%

538 \let\@oddhead\@undefined
539 \let\@evenhead\@undefined
540 \let\@oddfoot\@undefined
541 \let\@evenfoot\@undefined
542 \AtEndOfClass{%
543 \appdef\class@documenthook{%
544 \@provide\@oddhead{}%
545 \@provide\@evenhead{}%
546 \@provide\@oddfoot{}%
547 \@provide\@evenfoot{}%
548 }%
549 }%

```

`\lastpage@putlabel` Support the default meaning of `\@endpage`. Name of this macro (and the `\label` key) taken from [CTAN:/macros/latex/contrib/other/lastpage](https://ctan.org/ctan/packages/macros/latex/contrib/other/lastpage) with code optimised slightly.

```

550 \def\lastpage@putlabel{%
551 \if@filesw
552 \begingroup
553 \advance\c@page\m@ne
554 \immediate\write\@auxout{\string\newlabel{LastPage}{\thepage}}%
555 \endgroup
556 \fi
557 }%

```

Install a late hook into `\class@enddocumenthook` that labels the last page of the document. This is done just before the `.aux` file is closed, and does not require a `\shipout`, because it writes directly to the `.aux` file. Note that we invoke `\clearpage`: this means that no more typesetting should be done past this point. CHECKME: are there any more things installed via `\AtEndOfClass` `\class@enddocumenthook`?

```

558 \AtEndOfClass{%
559 \appdef\clear@document{%
560 \clearpage
561 \lastpage@putlabel
562 }%
563 }%

```

9 Required Packages

CTAN:macros/latex/contrib/other/misc/url.sty

```

564 \RequirePackage{url}%

```

10 Incompatible Packages

Known to be incompatible are `multicol` and `cite`. The former is incompatible with `ltxgrid`, which replaces it. The latter is incompatible with `natbib`, which replaces its functionality.

```

565 \appdef\class@inithook{%
566 \incompatible@package{cite}%
567 \incompatible@package{multicol}%
568 }%

```

11 Society- and Journal-Specific Code

`\@journal` Journal test helper, used as

```

%\@ifx{\@journal\journal@pra}{%
% <journal-specific setup>
%\fi
%

```

Journal code might like to further specify (if as yet undefined) or distinguish on the following Booleans.

Note: the journal substyle code should only alter the value of one of these Booleans if the Boolean is `\undefined`. This convention is what makes the document's options take precedence over the values set by the journal.

FIXME: make this table an exhaustive listing of all the parameters set by the class options.

<code>\@pointsize</code>	(101112), depending on the type size
<code>\footinbib@sw</code>	true if footnotes are to be formatted in the bibliography
<code>\preprintsty@sw</code>	true for preprint and hyperpreprint
<code>\eqsecnum@sw</code>	true means that equations are numbered within sections
<code>\secnumarabic@sw</code>	true means the sections are to be numbered arabic
<code>\groupauthors@sw</code>	true means authors listed separately for each address
<code>\preprint@sw</code>	true means to produce the preprint numbers as part of the title block
<code>\showPACS@sw</code>	true means to produce the PACS as part of the title block
<code>\showKEYS@sw</code>	true means to produce the keywords as part of the title block
<code>\@affils@sw</code>	true means each affiliation is printed, for each author
<code>\runinaddress@sw</code>	true means author addresses are printed run-in
<code>\draft@sw</code>	true implies that PACS will be printed
<code>\tightenlines@sw</code>	true if preprint single spaced
<code>\lengthcheck@sw</code>	true if length checking is in effect
<code>\byrevtex@sw</code>	true means to announce “typeset by REVTeX”
<code>\titlepage@sw</code>	true for title is to be set on a separate page
<code>\twocolumn@sw</code>	true if two-column page grid
<code>\twocolumn@sw</code>	true if we are to automatically balance the columns of the last page
<code>\twoside@sw</code>	true means to format pages for duplex printing
<code>\floats@sw</code>	false means floats are migrated to end of document
<code>\floatp@sw</code>	true means endfloats are set one to a page
<code>\class@amsfonts</code>	if <code>\@empty</code> , means that <code>amsfonts</code> will <i>not</i> be loaded
<code>\class@amssymb</code>	if <code>\@empty</code> , means that <code>amssymb</code> will <i>not</i> be loaded
<code>\frontmatter@footnote</code>	if <code>\undefined</code> , means that the default (<code>\footnote</code>) will be used
<code>\place@bibnumber</code>	if <code>\undefined</code> , means that the default (inline) will be used

Note: if `\twocolumn@sw` and `\preprintsty@sw` are both false, then ‘galley’ style is in effect. The `galley` option invokes `onecolumn`, but does not affect the `\preprintsty@sw`.

Note: `\paperwidth` and `\paperheight` are not integrated into this scheme, and should be selected by the document alone.

12 Front Matter

12.1 The title command

`\title` The author uses `\title` to specify the title. As in the AMS classes, `\title` has an optional argument specifying a short form for use in running heads.

Once the `\title` is given, you can specify any combination of `\thanks`, `\email`, `\homepage`, and `\altaffiliation` commands, applying to the title of the document.

```

569 \renewcommand\title[2] [] {%
570   \def\@title{#2}%
571   \def\@shorttitle{#1}%
572   \let\@AF@join\@title@join
573 }%
```

`\@title` The arguments to `\title` are saved in these internal macros, which are set up to produce a warning if `\title` has not been used before `\maketitle`.

```

574 \appdef\class@inithook{%
575 \def\@title{\class@warn{No title}}%
576 \let\@shorttitle\@empty
577 \let\@title@aux\@title@aux@cleared
578 }%

```

`\@title@join`

```

\@title@join@ 579 \def\@title@join{\expandafter\@title@join@\@title@aux}%
\@title@aux@cleared 580 \def\@title@join@#1#2{%
581 \def\@title@aux{\@join{\@separator}{#1}{#2}}%
582 }%
583 \def\@title@aux@cleared{}}%

```

12.2 The author, affiliation, and related commands

`\c@affil` A counter to store the affiliation numbers used for the superscript marks. This command defines `\theaffil`.

```
584 \newcounter{affil}
```

12.2.1 Commands for author or collaboration

`\author` Each author is given in a *separate* `\author` command. This is similar to the AMS classes, but the AMS also try to support the `article` class's `\and` command for putting multiple authors in one `\author` command. REVTeX, however, does not support the `\and` command.

When the `\author` command is encountered, the previous author, author group, affiliation, and affiliation group are at an end. This procedure moves the previous author to the author group (`\move@AU`), moves the previous affiliation to the affiliation group (`\move@AF`), and terminates the previous author/affiliation group (`\move@AUAF`) as the case may require.

```

585 \renewcommand\author{% implicit #1
586 \@author@def{}}% implicit #2
587 }%

```

`\collaboration` Specify the collaboration (given after a group of authors).

`\@collaboration@` This procedure does exactly what `\author` does, and sets a flag signifying that the `\collaboration` command was given.

Note: earlier versions attempted to ignore the collaboration command if it was considered inappropriate. We must not do this, however, because it throws the state machine out of kilter.

```

588 \def\collaboration{% implicit #1
589 \groupauthors@sw{%
590 \class@warn{%
591 \string\collaboration\space is only allowed with superscriptaddress option.
592 Use superscriptaddress in place of groupedaddress, unsortedaddress, or runinaddress%

```

```

593 }%
594 }{}%
595 \@author@def{\@booleantrue\collaboration@sw}% implicit #2
596 }%

\@author@init Here are all the access procedures for the author data structure.
\@author@cleared We define a flag value for \@author(private), a procedure for setting \@author
\@authorclear@sw to the flag value (\@author@init), a Boolean to test against the flag value
\@author@def (\@authorclear@sw), and a procedure to add new ancillary data to the author.
\@author@join@ 597 \def\@author@cleared{}{}%
\@author@join 598 \def\@author@init{%
599 \let\@author\@author@cleared
600 }%
601 \def\@authorclear@sw{\@ifx{\@author\@author@cleared}}%
602 \appdef\class@inithook{%
603 \@author@init
604 }%
605 \def\@author@def#1#2{%
606 \move@AU\move@AF\move@AUAF
607 \let\@AF@join\@author@join
608 #1%
609 \def\@author{#2}{}%
610 }%
611 \def\@author@join#1#2#3{%
612 \def\@author{#1}{\@join{\@separator}{#2}{#3}}%
613 }%
614 \def\@author@join{\expandafter\@author@join@\@author}%
615 \def\@author@gobble#1#2{%

\move@AU Move the most recent author to the list of current authors. If we recently did a
\@author@init, this is a no-op. If we recently encountered a \collaboration, we
preface the author with the \CO@opr intercollated operator, otherwise we apply
\AU@opr.

616 \def\move@AU{%
617 \@authorclear@sw{}{}%
618 \collaboration@sw{%
619 \expandafter\appdef
620 \expandafter\AU@grp
621 \expandafter{%
622 \expandafter \CO@opr
623 \@author
624 }%
625 }{}%
626 \expandafter\appdef
627 \expandafter\AU@grp
628 \expandafter{%
629 \expandafter \AU@opr
630 \@author
631 }%

```

```

632 }%
633 }%
634 \@author@init
635 \@booleanfalse\collaboration@sw
636 }%

```

`\@author@finish` We define a procedure to terminate author/affiliation parsing just before the title block is formatted. We detect the case where an author group is not followed by an affiliation group.

We first finish off any author- or affiliation groups in progress. Next, we detect the case where there is an author group in progress, but no affiliation group. If so, we emit a diagnostic message and act as if a `\noaffiliation` command had been given. In any case, we finish off any author/affiliation pair that may remain. Formatting of the title block may now proceed.

```

637 \def\@author@finish{%
638 \move@AU\move@AF
639 \@ifx{\AU@grp\@empty}{-}{%
640 \@ifx{\AF@grp\@empty}{-}{%
641 \begingroup
642 \let\href\@secondoftwo
643 \let\AU@opr\@firstoftwo
644 \let\CO@opr\@firstoftwo
645 \class@warn{Assuming \string\noaffiliation\space for \AU@grp}%
646 \endgroup
647 \begingroup\@affiliation{\blankaffiliation}\endgroup in \@affiliation
648 \move@AF
649 %
650 % \appdef \@AAC@list{\AF@opr}%
651 % \appdef@eval\@AAC@list{\AF@grp}%
652 % \appdef@e \@AAC@list{\AU@grp}%
653 % \let\AU@grp\@empty
654 % \let\AF@grp\@empty
655 }{-}%
656 }%
657 \move@AUAF
658 }%

```

`\@join` The procedure `\@join` inserts a separator between two tokens, or, if the first token is nil, elides both that token and the separator.

```

659 \def\@join#1#2#3{%
660 \@if@empty{#2}{#3}{#2#1#3}%
661 }%
662 \def\@separator{;\space}%

```

`\surname` No-op to allow better post-processing of the file.
`\firstname` 663 `\let\surname\@firstofone`
664 `\let\firstname\@firstofone`

`\AU@grp` The control sequence name `\AU@grp` accretes consecutive `\author` entries (with `\AU@opr` as the intercollated operator) and `\collaboration` entries (with `\CO@opr` as the intercollated operator). Ultimately, its contents are appended to the author/affiliation list `\AAC@list`. It must be initialized to `\@empty`.

Note on `\AU@opr` and `\CO@opr`: it is essential to treat these two operators to the greatest extent possible on an equal footing. Therefore we invariably assign values to the pair of them within the same procedure.

```
665 \let\AU@grp\@empty
```

`\and` The original L^AT_EX idea of using one `\author` command to capture all authors and their address just doesn't work with multiple authors possibly sharing addresses, so in this class disable `\and`.

```
666 \renewcommand\and{\class@err{\protect\and\space is not supported}}
```

12.2.2 Commands for affiliation

`\affiliation` After each group of authors with the same address, give that address in `\affiliation`. If later in the list you have an author with the address of an earlier author, repeat the `\affiliation` command: the system will detect the similarity and (if using the `superscriptaddress` option) only print the affiliation once, reusing the superscript marker.

When the `\affiliation` command is encountered, the current author and author group (if any) are at an end. Also, the current affiliation is at an end.

FIXME: changes to catcode required elsewhere now?

```
667 \def\cat@comma@active{\catcode'\,\active}%
668 {\cat@comma@active\gdef,{\active@comma}}%
669 \def\active@comma{,\penalty-300\relax}%
670 \newcommand\affiliation{%
671   \move@AU\move@AF
672   \begingroup
673   \cat@comma@active
674   \@affiliation
675 }%
676 \def\@affiliation#1{%
677   \endgroup
678   \let\@AF@join\@affil@join
679   \@affil@def{#1}%
680 }%
```

`\noaffiliation` User-level command signifying that the current group of authors has *no* affiliation.

This is implemented by acting as if the `\affiliation` command has been given, and using a flag value of `\blankaffiliation`, which `\@affil@group` can recognize as a no-op.

```
681 \newcommand\noaffiliation{%
682   \move@AU\move@AF
683   % \edef\AF@grp{\AF@grp}%
684   \begingroup\@affiliation{\blankaffiliation}%
```

```

685 % \move@AF
686 }%
687 \def\blankaffiliation{}%

\@affil@cleared Here are all the access procedures for the affiliation data structure. Note the
\@affil@init similarity to those of the \@author data structure.
\@affilclear@sw We define a flag value for \@affil (private), a procedure for setting \@affil
\@affil@def to the flag value (\@affil@init), a Boolean to test against the flag value
\@affil@join@ (\@affilclear@sw), and a procedure to add new ancillary data to the affiliation.
\@affil@join 688 \def\@affil@cleared{{}}%
689 \def\@affil@init{%
690 \let\@affil\@affil@cleared
691 }%
692 \def\@affilclear@sw{\@ifx{\@affil\@affil@cleared}}%
693 \appdef\class@inithook{%
694 \@affil@init
695 }%
696 \def\@affil@def#1{\def\@affil{{#1}}}%
697 \def\@affil@join@#1#2#3{%
698 \def\@affil{{#1}}{\@join{\@separator}{#2}{#3}}%
699 }%
700 \def\@affil@join{\expandafter\@affil@join@\@affil}%

\move@AF Move the most recent affiliation to the affiliation group. If we recently did a
\@affil@init, this is a no-op.
701 \def\move@AF{%
702 \@affilclear@sw{}%

Set the \@temp@sw to false, then execute the affiliation list (\@AFF@list) with the
intercolated operator set to \@affil@match and with \@tempa holding the first
component of \@affil, the current affiliation, which is to be matched. If the
current affiliation has been seen before, \@temp@sw will be set to true, \@tempc will
be set to the existing affiliation number, and \@tempd will be set to the affiliation's
ancillary data. The Boolean \@affils@sw being false prevents this test from ever
returning a positive result.

This procedure uses \@tempa and sets \@tempc, \@tempd, and \@temp@sw.
703 \@booleanfalse\@temp@sw
704 \let\@tempd\@empty
705 \@affils@sw{%
706 \expandafter\@firstoftwodef\expandafter\@tempa\@affil
707 \def\@AFF@opr{\@affil@match\@tempa}%
708 \@AFF@list
709 }{\@temp@sw

True clause: This affiliation has been seen before. If ancillary data for the affilia-
tion have been given but are not identical to those seen before, give a warning.
710 {%
711 \expandafter\@secondoftwodef\expandafter\@tempb\@affil
712 \@ifx{\@tempb\@empty}{}%

```

```

713 \ifx{\@tempb\@tempd}{}{%
714 \class@warn{%
715 Ancillary information for \@tempa\space must not be different!
716 Please put it on the first instance%
717 }%
718 }%
719 }%
720 \appdef@eval\AF@grp\@tempc
721 }%

```

False clause: This is a new address: increment the counter to get a unique ID for the new affiliation and append the new number, address, and footnote to the list \@AFF@list.

```

722 {%
723 \if@empty{\expandafter\@firstoftwo\@affil}{%
724 \edef\@tempc{\z}%
725 }{%
726 \stepcounter{affil}%
727 \edef\@tempc{\theaffil}%
728 }%
729 \appdef \@AFF@list{\AFF@opr}%
730 \appdef@eval\@AFF@list\@tempc
731 \appdef@e \@AFF@list{\@affil}%
732 \appdef@eval\AF@grp\@tempc
733 }%

```

Append the ID of the affiliation to the affiliation group of the current author group.

```

734 \@affil@init
735 }%
736 }%
737 \def\@firstoftwodef#1#2#3{%
738 \def#1{#2}%
739 }%
740 \def\@secondoftwodef#1#2#3{%
741 \def#1{#3}%
742 }%

```

\move@AUAF Append \AF@grp and \AU@grp to \@AAC@list and merge any new \AF@grp to \@AFG@list.

```

743 \def\move@AUAF{%
Entire procedure is predicated on something non-trivial to move.
  If both author and affiliation are nil, bail out.
  No, try that again:
  If we have seen any affiliations, then it is time to move the current affiliation
  group and author group to \@AAC@list. If not, we are picking up authors into an
  author group, and we should bail out.
744 %\ifx{\AU@grp\@empty}{\ifx{\AF@grp\@empty}{\true@sw}{\false@sw}}{\false@sw}%
745 \ifx{\AF@grp\@empty}%

```

746 {}-%

First, append current affiliation group (expansion of `\AF@grp`) to the author/affiliation list (`\@AAC@list`), using `\AF@opr` as the intercolated operator; also append the current authors (`\AU@grp`).

```
747 \appdef \@AAC@list{\AF@opr}%
748 \appdef@eval\@AAC@list{\AF@grp}%
749 \appdef@e \@AAC@list{\AU@grp}%
```

Next, append the current affiliation group to `\@AFG@list`, (if it is not already there) using `\AFS@opr` as the intercolated operator.

Note that `\@AFG@list` is a list of *unique* affiliation groups.

```
750 \@ifx{\@empty\AU@grp}{}-%
751 \@ifx{\@empty\AF@grp}{}-%
752 \booleanfalse\temp@sw
753 \def\AFS@opr{\x@match\AF@grp}%
754 \@AFG@list
755 \temp@sw{}-%
756 \appdef \@AFG@list{\AFS@opr}%
757 \appdef@eval\@AFG@list{\AF@grp}%
758 }%
759 }%
760 }%
```

Finally, null out the macros holding the author group and affiliation group, respectively.

```
761 \let\AU@grp\@empty
762 \let\AF@grp\@empty
763 }%
764 }%
```

`\@AAC@list` The `\@AAC@list` macro accretes authors (using `\AU@opr` as the intercolated operator), collaborations (using `\CO@opr` as the intercolated operator), and affiliations (using `\AF@opr` as the intercolated operator).

```
765 \appdef\class@inithook{%
766 \let\@AAC@list\@empty
767 }%
```

`\@AFG@list` The macro `\@AFG@list` accretes `\AF@grp`, with `\AFS@opr` as the intercolated operator.

This token list is employed when and only when `groupedaddress` is in effect. It must be empty at the beginning of the document.

```
768 \appdef\class@inithook{%
769 \let\@AFG@list\@empty
770 }%
```

`\@AFF@list` The macro `\@AFF@list` accretes the list of affiliations with `\AFF@opr` as the intercolated operator. It must be empty at the beginning of the document.

Each `\affiliation` command in the document contributes to this list, as long as the argument of that instance of the command is “new”.

Each entry in this list consists of the `\AFF@opr` intercolated operator followed by three brace-delimited tokens, representing, in order:

1. the affiliation's unique ID, a number increasing monotonically for each new entry,
2. the optional argument of the `\affiliation` command, the footnote to the affiliation, and
3. the text of the affiliation.

At various junctures in the code, the control sequence name `\AFF@opr` assumes the meaning of `\@affil@footnote` (FIXME: never used), `\@affil@group`, `\affil@script`, or is defined to expand to `\@affil@match\@tempa`. and the list `\@AFF@list` is expanded.

```
771 \appdef\class@inithook{%
772 \let\@AFF@list\@empty
773 }%
```

`\AF@grp` The macro `\AF@grp` accretes affiliation IDs into an affiliation group. It must be empty at the beginning of the document.

```
774 \let\AF@grp\@empty
```

`\@affil@match` The definition for the `\AFF@opr`, the intercolated operator for `\@AFF@list`, when adding a new affiliation: seeks a match with any earlier affiliation. When the affiliation list is executed, this procedure tests each entry against the 'new' affiliation (which has been stored in `\@tempa`).

Uses `\temp@sw`, `\@tempc`, and `\@tempd` to communicate back: if it returns `\temp@sw` true, a match was found, then `\@tempc` will be the footnote number of the matching entry and `\@tempd` will be the auxiliary information of the matching entry.

```
775 \def\@affil@match#1#2#3#4{%
776 \temp@sw{ }{%
777 \def\@tempifx#3}%
778 \@ifx{\@tempifx#1}{%
779 \@booleantrue\temp@sw
780 \def\@tempc#2}%
781 \def\@tempd#4}%
782 }{%
783 }%
784 }%
785 }%
```

`\@tempaffil@script` Give a superscript marker to the address, and junk the text argument (#2).

```
786 %\def\@tempaffil@script#1#2{%
787 % ,\,#1%
788 }%
```

`\@tempaffil@group` Execute if we are grouping authors above ‘main addresses’ (`groupedaddress`). Put temp address in a footnote, with explanatory text. Note: this procedure uses `\@tempb` and `\@tempc` to communicate to `\AFF@opr`.

```
789 %\def\@tempaffil@group#1#2{%
790 % \def\@tempc{#1}%
791 % \def\@tempb{#2}%
792 % \begingroup
793 % \let\AFF@opr \@affil@footnote
794 % \@AFF@list
795 % \endgroup
796 %}%
```

`\@affil@footnote` The alias of `\AFF@opr` when `\@AFF@list` is executed by `\@tempaffil@group`. If we find a match of the affiliation number to `\@tempc`, then footnotes are formatted with the relevant content and `\@tempb`.

```
797 %\def\@affil@footnote#1#2#3{%
798 % \def\@tempifx{#1}%
799 % \@ifx{\@tempifx\@tempc}{%
800 % \comma@space
801 % \expandafter\frontmatter@footnote\expandafter{\@tempb#2}%
802 % \frontmatter@footnote{#3}%
803 % }{%
804 % }%
805 %}%
```

`\@AF@join` The `\csname \@AF@join` is a procedure used within `\email`, `\homepage`, `\thanks`, and `\altaffiliation`. When such a command appears after an `\author`, `\collaboration`, or `\affiliationcommand`, the `\@AF@join` procedure appends the argument given to the appropriate macro. Its default is to give an error message, since these commands are legal only within the particular context mentioned.

```
806 \appdef\class@inithook{%
807 \let\@AF@join\@AF@join@error
808 }%
809 \def\@AF@join@error#1{%
810 \class@warn{%
811 \string\email, \string\homepage, \string\thanks, or \string\altaffiliation\space
812 appears in wrong context.
813 }%
814 }%
```

12.2.3 Commands for auxiliary information

`\email` Just tacks the email address on to the current author or affiliation.

```
815 \def\sanitize@url{%
816 \@makeoother\%
817 \@makeoother\~%
818 \@makeoother\_%
819 }%
```

```

820 \newcommand*{\email}[1][Electronic address: ]{\begingroup\sanitize@url\@email{#1}}%
821 \def\@email#1#2{%
822 \endgroup
823 \@AF@join{#1\href{mailto:#2}{#2}}%
824 }%

```

`\homepage` Just tacks the URL on to the current author or affiliation. Note: group opened in `\homepage` is closed in `\@homepage`.

```

825 \newcommand*{\homepage}[1][URL:~]{\begingroup\sanitize@url\@homepage{#1}}%
826 \def\@homepage#1#2{%
827 \endgroup
828 \@AF@join{#1\url{#2}}%
829 }%

```

```

\url
\href 830 \appdef\class@documenthook{%
831 \providecommand\url{\texttt}%
832 \providecommand\href[2]{\url{#2}}%
833 }%

```

`\thanks` The operative version of `\thanks` appends an item to `\@author`, or `\@affil`'s auxiliary data.

```

834 \def\thanks{% implicit #1
835 \@AF@join
836 }%

```

`\altaffiliation` Implemented more or less like `\thanks` but shares the affiliation counter. Optional argument may be used to give explanatory text eg 'currently staying at' This will be placed before the address, if used in a footnote.

```

837 \newcommand*{\altaffiliation}[2][ ]{%
838 \@AF@join{#1#2}%
839 }%

```

12.2.4 Procedures for author, collaboration, and affiliation

Macros that list off, say, authors, and which require punctuation, like "A, B, and C", will use `\set@listcomma@list`, `\set@listcomma@count`, `\@listand`, and `\@listcomma`. These macros use the `\@tempcnta` register to keep track of how many items remain to be listed off.

At present, `\@author@present` will decrement that counter.

`\set@listcomma@list` Pop the author count for this collaboration.

`\set@listcomma@count` Note: by side effect, it assigns `\@listcomma`: for a list of length two, suppress comma addition.

```

840 \def\set@listcomma@list#1{%
841 \expandafter\@reset@ac\expandafter#1#1{0}\@reset@ac{%
842 \let\@listcomma\relax
843 }%

```

```

844 \let\@listcomma\@listcomma@comma
845 }%
846 }%
847 \def\set@listcomma@count#1{%
848 \@ifnum{#1=\tw@}{%
849 \let\@listcomma\relax
850 }{%
851 \let\@listcomma\@listcomma@comma
852 }%
853 }%

```

Does the actual pop operation, then generates a Boolean which selects one of the two assignments for `\@listcomma`.

Note: this procedure sets `\@tempcnta` to reflect the number of items to list off.

```

854 \def\@reset@ac#1#2#3\@reset@ac{%
855 \def#1{#3}%
856 \@tempcnta#2\relax
857 \@ifnum{#2=\tw@}%
858 }%

```

`\listand` Might need extending with penalties etc.

Note: this procedure expects `\@tempcnta` to reflect the current number of items remaining to list off.

```

859 \def\@listand{\@ifnum{\@tempcnta=\tw@}{\andname\space}{}}%

```

`\@listcomma` This definition, with `\@one` puts a comma before and.

David Carlisle says: In UK English (at least) would have `\tw@` here, which would then implement the convention of indicating conjunction with comma or “and”, but not both.

Note: this procedure expects `\@tempcnta` to reflect the current number of items remaining to list off.

```

860 \def\@listcomma@comma{\@ifnum{\@tempcnta>\@one}{,}{}}%
861 \def\@listcomma@comma@UK{\@ifnum{\@tempcnta>\tw@}{,}{}}%

```

`\@collaboration@err` This command will be executed if are in a `groupedaddress` situation and the document contained a `\collaboration` command.

There already has been issued a warning message explaining that `\collaboration` is wrong in this case, so here we simply gobble.

```

862 \def\@collaboration@err#1#2{%
863 %\class@warn{An illegal \string\collaboration\ command has been entered!}%
864 }%

```

`\doauthor` Main control over how authors are typeset.

`#1` is loaded by `\author`

`#2` is loaded by `\email`, `\homepage`, `\altaffiliation`, or `\thanks`

`#3` is the superscript affiliation, if at all used.

First, the author name is formatted, followed by a comma, then come any marks relating to affiliation (if present), then come the homepage URL and email address, if any, with appropriate punctuation.


```

865 \def\doauthor#1#2#3{%
866   \ignorespaces#1\unskip\@listcomma
867   \def\@tempifx{#3}%
868   \@ifx{\@tempifx\@empty}{%
869     \def\@tempifx{#2}%
870     \@ifx{\@tempifx\@empty}{\frontmatter@footnote{#2}}%
871   }{%
872     #3%
873     \def\@tempifx{#2}%
874     \@ifx{\@tempifx\@empty}{\comma@space\frontmatter@footnote{#2}}%
875   }%
876   \space \@listand
877 }%

```

`\AF@opr` DPC: The number(s) associated to the affiliation address(es).

`\@thanks` Society-specific options may change this. `\comma@space` is a separator between adjacent footnotes.

```
878 \def\@thanks{\comma@space\footnote}
```

`\x@match` Procedure `\x@match` is used as an alias `\AFS@opr`, probing the list of affiliation groups and setting a Boolean if a match is found to #1 (usually the current affiliation group).

Procedure `\y@match` is used as an alias to `\@TBN@opr`, probing the list of unique title block footnotes for a match to the footnote text: when the first match is found it sets a Boolean, defining `\@tempb` to the number of that footnote.

```

879 \def\x@match#1#2{%
880   \temp@sw{}{%
881     \def\@tempifx{#2}%
882     \@ifx{\@tempifx#1}{%
883       \@booleantrue\temp@sw
884     }{%
885       }%
886     }%
887 }%
888 \def\y@match#1#2#3{%
889   \temp@sw{}{%
890     \def\@tempifx{#3}%
891     \@ifx{\@tempifx#1}{%
892       \@booleantrue\temp@sw
893     \def\@tempb{#2}%
894   }{%
895     }%
896   }%
897 }%

```

`\frontmatter@footnote` Used when typesetting a title block footnote. (Item 290: merge duplicates.)

Maintains a list of frontmatter footnotes along with associated device. Uniquifies each footnote by traversing the list and looking for a match to the footnote

text. If found, define `\@tempb` to the corresponding footnote device, and typeset it with `\@footnotemark`. If never found, manually increment footnote counter, determine the corresponding footnote device, and add footnote text and device to the list of frontmatter footnotes.

The list `\@FMN@list` is processed later in the title block production.

Note that this method of making footnotes runs afoul of `hyperref`'s patches of the L^AT_EX kernel. Therefore, we avoid trouble by refraining from using `\@footnotemark` and by creating our own hypertext links.

```

898 \def\frontmatter@footnote#1{%
899 \begingroup
900 \@booleanfalse\temp@sw
901 \def\@tempa{#1}%
902 \let\@tempb\@empty
903 \def\@TBN@opr{\y@match\@tempa}%
904 \@FMN@list
905 \temp@sw{%
906 \expandafter\frontmatter@footnotemark
907 \expandafter{\@tempb}%
908 }{%
909 \stepcounter\@mpfn
910 \protected@xdef\@tempb{\the\csname c@\@mpfn\endcsname}%
911 \expandafter\frontmatter@footnotemark
912 \expandafter{\@tempb}%
913 \expandafter\g@addto@macro
914 \expandafter\@FMN@list
915 \expandafter{%
916 \expandafter \@TBN@opr
917 \expandafter {\@tempb}{#1}%
918 }%
919 }%
920 \endgroup
921 }%
922 \appdef\class@inithook{%
923 \global\let\@FMN@list\@empty
924 }%
925 \def\frontmatter@footnotemark#1{%
926 \leavevmode
927 \ifhmode\edef\@x@sf{\the\spacefactor}\nobreak\fi
928 \begingroup
929 \hyper@linkstart {link}{frontmatter@#1}%
930 \csname c@\@mpfn\endcsname#1\relax
931 \def\@thefnmark{\thempfn}%
932 \@makefnmark
933 \hyper@linkend
934 \endgroup
935 \ifhmode\spacefactor\@x@sf\fi
936 \relax
937 }%

```

12.3 The keywords command

`\keywords` Usual game, save text in a macro for processing by `\maketitle`.
`\@keywords` 938 `\def\keywords#1{%`
939 `\aftermaketitle@chk{\keywords}%`
940 `\gdef\@keywords{#1}%`
941 `}%`
942 `\def\@keywords{}`

12.4 The `\date` command and related commands

`\date` Use the `\date` command to specify the document date, the `\received` command to
`\received` specify the date received, `\revised` for date revised, `\accepted` for date accepted,
`\revised` and `\published` for date published. Normally only `\date` to be used by author,
`\accepted` the remainder used only by editors.
`\published` DPC: As for `\keywords`, but this time don't flag a warning if there is no
`\@date` revision date specified.
`\@received` In each case the user-level command defines the value of a macro which buffers
`\@revised` the data entered by the user. For instance, `\received` causes `\@received` to
`\@accepted` acquire a value. The optional argument allows the user to override the text that
`\@published` will be typeset along with the date; the default value of that text is itself a localized
macro.

```
943 \renewcommand*\date[2][\Dated@name]{\def\@date{#1#2}}%
944 \def\@date{}%
945 \newcommand*\received[2][\Received@name]{\def\@received{#1#2}}%
946 \def\@received{}%
947 \newcommand*\revised[2][\Revised@name]{\def\@revised{#1#2}}%
948 \def\@revised{}%
949 \newcommand*\accepted[2][\Accepted@name]{\def\@accepted{#1#2}}%
950 \def\@accepted{}%
951 \newcommand*\published[2][\Published@name]{\def\@published{#1#2}}%
952 \def\@published{}%
```

12.5 The pacs command

PACS, the Physics and Astronomy Classification Scheme.

`\pacs` As for `\keywords`
`\@pacs` 953 `\def\pacs#1{%`
954 `\aftermaketitle@chk{\pacs}%`
955 `\gdef\@pacs{#1}%`
956 `}%`
957 `\def\@pacs{}{\class@warn{No PACS numbers}}%`

12.6 The `\preprint` command

```
958 \def\preprint#1{\gappdef\@preprint{\preprint{#1}}}%
959 \let\@preprint\@empty
```

12.7 draft

DPC: Name clash with draft option. L^AT_EX doesn't care, but it confuses me.

This command is a 3.1 relic, now removed.

```
960 %\newcommand\draft{\@booleantrue\draft@sw}%
```

12.8 The abstract environment

`\absbox`

```
961 \newbox\absbox
```

`abstract` Abstract, as in AMS classes, must be specified *before* `\maketitle`. It just saves everything up in `\absbox`.

```
962 % \changes{v4.e}{1998/01/31}
```

```
963 %   {hookify}
```

```
964 % Note that the specifics of how the abstract is to be
```

```
965 % formatted are set by \cmd\frontmatter@abstractwidth,
```

```
966 % \cmd\frontmatter@abstractheading, and \cmd\frontmatter@abstractfont.
```

```
967 %
```

```
968 % Here we wish to set the abstract into type but save it away in a box, much like
```

```
969 % the \cmd\minipage\ command does.
```

```
970 %
```

```
971 % Note that the \cmd\endabstract\ portion of the environment
```

```
972 % begins with code that mostly duplicates \cmd\endminipage, but without the \cmd\@iiiparbox.
```

```
973 % At the end, we simply transfer the contents of the \cmd\minipage\
```

```
974 % into a box of our own.
```

```
975 %
```

```
976 % However, we also have to end the gratuitous
```

```
977 % paragraph begun by \cmd\minipage.
```

```
978 % We ensure that no trace of that paragraph is left,
```

```
979 % by absorbing the \cmd\parindent\ box.
```

```
980 % Doing so destroys the paragraph entirely, except
```

```
981 % for the \cmd\parskip\ glue, and that morsel is pruned, because we are at the top
```

```
982 % of a page.
```

```
983 %
```

```
984 % This mechanism is vulnerable, however, because anything placed into the horizontal list
```

```
985 % after the \cmd\parindent\ box will confound it.
```

```
986 % And that is exactly what happens under MikTeX:
```

```
987 % There seems to be an extension to the  $\TeX$  standard operating here which inserts a \cmd\spec
```

```
988 % (The mechnism is \emph{not} based on \cmd\everypar.)
```

```
989 %
```

```
990 % To accomodate this state of affairs,
```

```
991 % we have a new mechanism that offers an even more complete rewrite of \env{minipage}.
```

```
992 %
```

```
993 % The user can elect to use this new mechanism via the \classoption{newabstract};
```

```
994 % likewise the old mechanism via the \classoption{oldabstract}.
```

```
995 %
```

```
996 %   \begin{macrocode}
```

```
997 \newenvironment{abstract}{%
```

```

998 \aftermaketitle@chk{\begin{abstract}}}%
999 \global\setbox\absbox\vbox\bgroup
1000 \color@begingroup
1001 \columnwidth\textwidth
1002 \hsize\columnwidth
1003 \@parboxrestore
1004 \def\@mpfn{mpfootnote}\def\thempfn{\thempfootnote}\c@mpfootnote\z@
1005 \let\@footnotetext\frontmatter@footnotetext
1006 \minipagefootnote@init
1007 \let\@listdepth\@mplistdepth \@mplistdepth\z@
1008 \@minipagerestore
1009 \@setminipage
1010 \frontmatter@abstractheading
1011 \frontmatter@abstractfont
1012 \let\footnote\mini@note
1013 }{%
1014 \par
1015 \unskip
1016 \minipagefootnote@here
1017 \@minipagefalse %% added 24 May 89
1018 \color@endgroup
1019 \egroup
1020 }%

```

`\frontmatter@footnotetext` We reimplement `\@mpfootnotetext` under a new name (so as not to be overridden by the `hyperref` package) and extend it to accomodate hyperrefs.

Note that this procedure is very like `ltxutil`'s `\mp@footnotetext`, except that it uses `p@mpfootnote` instead of `p@mpfootnote`, and `\frontmatter@makefntext` instead of `\@makefntext`.

```

1021 \long\def\frontmatter@footnotetext#1{%
1022 \minipagefootnote@pick
1023 \reset@font\footnotesize
1024 \interlinepenalty \interfootnotelinepenalty
1025 \splittopskip \footnotesep
1026 \splitmaxdepth \dp \strutbox
1027 \set@footnotewidth
1028 \@parboxrestore
1029 \protected@edef\@currentlabel{\csname p@mpfootnote\endcsname\@thefnmark}%
1030 \color@begingroup
1031 \frontmatter@makefntext{%
1032 \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox
1033 }%
1034 \color@endgroup
1035 \minipagefootnote@drop
1036 }%

```

`\frontmatter@abstractheading` The default abstract head; journals will override this procedure.

```

1037 \def\frontmatter@abstractheading{%
1038 \begingroup

```

```

1039 \centering\large
1040 \abstractname
1041 \par
1042 \endgroup
1043 }%

```

`\frontmatter@abstractfont` The default type specification for the body of the abstract. Journals will override this setting.

```
1044 \def\frontmatter@abstractfont{ }%
```

`\frontmatter@abstractwidth` The default setting is the full text width; journals can override this setting.

```
1045 \def\frontmatter@abstractwidth{\textwidth}
```

`\frontmatter@abstract@produce` This procedure determines how the abstract is incorporated into the title block. We split this out in anticipation of the need to lift the limitation that the abstract not break over pages.

If we are in preprint style, we provide an easy pagebreak point immediately above the abstract. This means that the abstract will either fit entirely on the same page as the title block, or it will start a page of its own (which may itself break onto a subsequent page if necessary).

```

1046 \def\frontmatter@abstract@produce{%
1047   \par
1048   % \tracingall
1049   \preprintsty@sw{%
1050     \do@output@MVL{%
1051       \vskip\frontmatter@preabstractspace
1052       \vskip200\p@\@plus1fil
1053       \penalty-200\relax
1054       \vskip-200\p@\@plus-1fil
1055     }%
1056   }{%
1057     \addvspace{\frontmatter@preabstractspace}%
1058   }%
1059   % \leavevmode
1060   \begingroup
1061     \dimen@ \baselineskip
1062     \setbox\z@\vtop{\unvcopy\absbox}%
1063     \advance\dimen@-\ht\z@\advance\dimen@-\prevdepth
1064     \@ifdim{\dimen@>\z@}{\vskip\dimen@}{ }%
1065   \endgroup
1066   \unvbox\absbox
1067   \@ifx{\@empty\mini@notes}{ }\{\mini@notes\par}%
1068   % \par
1069   \addvspace\frontmatter@postabstractspace
1070   % \showlists
1071   % \tracingplain
1072 }%

```

`\frontmatter@preabstractspace` Space above and space below abstract in title block

`\frontmatter@postabstractspace`

```

1073 \def\frontmatter@preabstractspace{.5\baselineskip}
1074 \def\frontmatter@postabstractspace{.5\baselineskip}

```

12.9 Formatting the title block

`titlepage` This is L^AT_EX 2_ε's article class version, with modifications.

```

1075 \newenvironment{titlepage}{%
1076     \twocolumn@sw{\onecolumngrid}{\newpage}%
1077     \thispagestyle{titlepage}%
1078     \setcounter{page}\@ne
1079 }{%
1080     \twocolumn@sw{\twocolumngrid}{\newpage}%
1081     \twoside@sw{}%
1082     \setcounter{page}\@ne
1083     }%
1084 }%

```

`\maketitle` Put it all together to format the title block.

```

1085 \def\maketitle{%
1086     \@author@finish
1087     \title@column\titleblock@produce
1088     \suppressfloats[t]%

```

Now save some memory.

```

1089     \let\and\relax
1090     \let\affiliation\@gobble
1091 % \let\address\affiliation
1092     \let\author\@gobble
1093     \let\@AAC@list\@empty
1094     \let\@AFF@list\@empty
1095     \let\@AFG@list\@empty
1096 % \let\keywords\@gobble
1097 % \let\@keywords\@empty
1098     \let\@AF@join\@AF@join@error
1099     \let\email\@gobble
1100     \let\@address\@empty
1101     \let\maketitle\relax
1102     \let\thanks\@gobble
1103     \titlepage@sw{%
1104         \vfil
1105         \clearpage
1106     }{}%
1107 }%

```

`\titleblock@produce` This procedure produces the title block.

It effectively executes inside a group and always returns us to vertical mode.

Note: we assume that it is OK to set the footnote counter to zero at this point.

Is this a safe assumption?

```

1108 \def\titleblock@produce{%
1109     \begingroup

```

Special footnote version [of footnotes] for \thanks, copied from article class \maketitle.

```

1110 \let\footnote\footnote@latex
1111 \let\@makefnmark\@makefnmark@latex
1112 \let\@footnotemark\@footnotemark@latex
1113 \let\thefootnote\frontmatter\thefootnote
1114 % \let\@makefntext\frontmatter\@makefntext
1115 \global\c@footnote\z@
1116 \let\@makefnmark\frontmatter\@makefnmark
1117 \frontmatter@setup
1118 \thispagestyle{titlepage}\label{FirstPage}%

```

Produce the title:

```
1119 \frontmatter@title@produce
```

Produce the author list:

```

1120 \groupauthors@sw{%
1121 \frontmatter@author@produce@group
1122 }{%
1123 \frontmatter@author@produce@script
1124 }%

```

Produce the dates:

```

1125 \frontmatter@RRAPformat{%
1126 \expandafter\produce@RRAP\expandafter{\@date}%
1127 \expandafter\produce@RRAP\expandafter{\@received}%
1128 \expandafter\produce@RRAP\expandafter{\@revised}%
1129 \expandafter\produce@RRAP\expandafter{\@accepted}%
1130 \expandafter\produce@RRAP\expandafter{\@published}%
1131 }%

```

Produce the abstract, PACS, and keywords, and end any paragraph.

```

1132 \frontmatter@abstract@produce
1133 \@pacs@produce\@pacs
1134 \@keywords@produce\@keywords
1135 \par
1136 \frontmatter@finalspace
1137 \endgroup
1138 }%

```

`\frontmatter@title@produce` The default formatting procedure for the article title. This procedure should take care of the vertical space below the title.

Journals may override this procedure, but it is more likely that they will use the hooks `\frontmatter@title@above`, `\frontmatter@title@format`, and `\frontmatter@title@below`.

At this point, we patch into `\let@mark` so that the common markup idiom `\@` is taken care of.

```

1139 \def\frontmatter@title@produce{%
1140 \begingroup
1141 \frontmatter@title@above

```



```

1142 \frontmatter@title@format
1143 \@title
1144 \@ifx{\@title@aux\@title@aux@cleared}{-}{%
1145 \expandafter\frontmatter@footnote\expandafter{\@title@aux}%
1146 }%
1147 \par
1148 % \@ifx{\@shorttitle\@empty}{-}{%
1149 % \markboth{\@title}{\@title}%
1150 % }-%
1151 % \markboth{\@shorttitle}{\@shorttitle}%
1152 %% \class@warn{Unused short title ignored}%
1153 % }%
1154 \frontmatter@title@below
1155 \endgroup
1156 }%
1157 \appdef\let@mark{\let\\relax}%

```

`\frontmatter@title@above` The default values for formatting specifications for the article title.
`\frontmatter@title@format` The procedure `\frontmatter@title@above` should take care of the vertical space above the title; `\frontmatter@title@below` below. The procedure `\frontmatter@title@format` should invoke any font switches, etc. that may apply to the title.

Journals will override this procedure.

```

1158 \def\frontmatter@title@above{}%
1159 \def\frontmatter@title@format{}%
1160 \def\frontmatter@title@below{\advspace{\baselineskip}}%

```

12.9.1 Authors and affiliations in superscriptaddress style

`\frontmatter@author@produce@script` `\frontmatter@author@produce@script` is an alias for `\frontmatter@author@produce`, the procedure that formats the author/affiliation list.

In this case, the authors affiliations are being superscripted (class option `superscriptaddress`).

This procedure must ensure that any paragraph that it starts gets ended finally.

```

1161 \def\frontmatter@author@produce@script{%
1162 \begingroup
1163 \let\@author@present\@author@present@script

```

When the author/affiliation list `\@AAC@list` is executed, `\@tempcnt` counts each author, and `\@tempa` stores a list of author indices for the current collaboration.

Note: this procedure uses `\AU@temp` to hold a list of author counts for each collaboration. Note: also uses `\@tempcnta` to communicate between procedures. This usage of `\@tempcnta` is OK, because the expansion of `\@AAC@list` will trigger only the execution of our own procedures.

```

1164 \let\AU@temp\@empty
1165 \@tempcnta\z@

```

We wish to know how many authors are in each collaboration, for the purposes of `\listcomma` and `\listand`.

Here we assign values for the intercolated operators appearing within `\@AAC@list`, then execute that macro, registering the authors in each collaboration. Afterwards, clean up by emulating an empty collaboration.

The result, stored in `\AU@temp`, is a list of brace-delimited tokens, each a number representing the number of authors in that collaboration.

```
1166 \let\AF@opr \@gobble
1167 \def\AU@opr{\@author@count\@tempcnta}%
1168 \def\CO@opr{\@collaboration@count\AU@temp\@tempcnta}%
1169 \@AAC@list
1170 \expandafter\CO@opr\@author@cleared
```

Next, present the authors and their affiliations.

We assign values for the intercolated operators appearing within `\@AAC@list`. Next, assign `\@listcomma` based on the number of authors in the first collaboration. Then expand `\@AAC@list`.

Upon completion, there will be two space tokens following the last author because of `\listand` processing; remove them, then end the last paragraph.

FIXME: this juncture would be a good time to effectively eliminate the unused affiliations in `\@AFF@list`.

```
1171 \begingroup
1172 \frontmatter@authorformat
1173 \let\AF@opr \@affilID@def
1174 \let\AU@opr \@author@present
1175 \def\CO@opr{\@collaboration@present\AU@temp}%
1176 \set@listcomma@list\AU@temp
1177 \@AAC@list
1178 \unskip\unskip
1179 \par
1180 \endgroup
```

We now list out the affiliations in the order they appeared.

```
1181 \begingroup
1182 \frontmatter@above@affiliation@script
1183 % \let\@AFU@list\@empty
1184 % \let\AFS@opr \affils@present@script
1185 % \@AFG@list
1186 % \let\AF@opr \affil@present@script
1187 % \@AFU@list
1188 \let\AFF@opr \@affil@script
1189 % \say\@AFF@list
1190 \AFF@list
1191 \frontmatter@footnote@produce
1192 \par
1193 \endgroup
1194 \endgroup
1195 }%
```

`\@author@count` This version of `\AU@opr` counts the number of authors it processes.

```
1196 \def\@author@count#1{\advance#1\@ne\@author@gobble}%
```

`\@collaboration@present` Format a collaboration. Note that we immediately end the paragraph thus begun, because we only support `superscriptaddress`-style processing.

Note also that the execution of the production procedures takes place inside of a group; for reasons of protective programming.

Bug note: originally, the number of authors in each collaboration was stored in `\@tempa`, but this exposed us to procedures in our production that modified the meaning of `\@tempa`.

The last action done in this procedure is to assign `\@listcomma` based on the number of authors in the next collaboration.

```

1197 \def\@collaboration@present#1#2#3{%
1198   \par
1199   \begingroup
1200   \frontmatter@collaboration@above
1201   \@author@present{(\ignorespaces#2\unskip)}{#3}%
1202   \par
1203   \endgroup
1204   \set@listcomma@list#1%
1205 }%
1206 \def\frontmatter@collaboration@above{%

```

`\@collaboration@count` Simply register each author in this collaboration. Note: `#1` is a `\csname` to hold the value, `#2` is the `\count` register holding the count of interest.

```

1207 \def\@collaboration@count#1#2{%
1208   \appdef@eval#1{\the#2}#2\z@
1209   \@author@gobble
1210 }%

```

`\@affilID@def` The `\@affilID@def` procedure, an alias of `\AF@opr` used during `\frontmatter@author@produce@script` processing, memorizes the affiliation in `\@affilID@temp`.

```

1211 \def\@affilID@def{\def\@affilID@temp}%

```

`\@affilID@temp` The macro `\@affilID@temp` is used to communicate between `\doauthor` and instances of `\AF@opr` within the author list.

```

1212 \let\@affilID@temp\@empty

```

`\affils@present@script` An alias of `\AFS@opr`, this procedure is applied to `\@AFG@list` and builds `\@AFU@list`, a list of unique affiliations found within affiliation groups.

```

1213 %\def\affils@present@script#1{%
1214 % \get@affil#1{%
1215 %}%
1216 %\def\get@affil#1{%
1217 % \def\@tempa{#1}%
1218 % \ifx{\@empty\@tempa}{-}%
1219 % \booleanfalse\temp@sw
1220 % \def\AF@opr{\x@match\@tempa}%
1221 % \@AFU@list
1222 % \temp@sw}{-}%
1223 % \appdef\@AFU@list{\AF@opr{#1}}%

```

```

1224 % }%
1225 % \get@affil
1226 % }%
1227 %}%

```

`\affil@present@script` An alias of `\AFF@opr`, this procedure is applied to `\@AFU@list` when formatting the affiliations under `superscriptaddress`. It in turn applies `\affil@script` to `\@AFF@list`, thereby formatting the affiliation associated with this affiliation index.

Note: it traverses the `\@AFF@list` for each entry in the `\@AFU@list`, thereby making this portion of code execute in N^2 time.

```

1228 %\def\affil@present@script#1{%
1229 % \def\@tempa{#1}%
1230 % \begingroup
1231 % \frontmatter@affiliationfont
1232 % \let\AFF@opr \affil@script
1233 % \@AFF@list
1234 % \endgroup
1235 %}%

```

`\affil@script` Alias of `\AFF@opr`, this procedure is applied to `\@AFF@list` when formatting the affiliations under `superscriptaddress`. It rejects all entries not matching the affiliation index held in `\@tempa`.

```

1236 \def\affil@script#1#2#3{%
1237 \def\@tempifx{#1}\@ifx{\@tempifx\@tempa}{%
1238 \if@empty{#2}-}{%
1239 \par
1240 \begingroup
1241 \textsuperscript{\normalfont#1}%
1242 #2%
1243 \@if@empty{#3}-{\frontmatter@footnote{#3}}%
1244 \par
1245 \endgroup
1246 }%
1247 }-}{%
1248 }%

```

`\@affil@script` Alias of `\AFF@opr`: The affiliations are being formatted in the case where affiliations are being superscripted: make a list out of the affiliations with the numbers printed. Society-specific code can change the formatting by overriding the definition of `\frontmatter@affiliationfont`.

FIXME: dead code.

```

1249 \def\@affil@script#1#2#3{%
1250 \@ifnum{#1=\z@}-}{%
1251 \par
1252 \begingroup
1253 \frontmatter@affiliationfont
1254 % \textsuperscript{\normalfont#1}%

```

```

1255 \textsuperscript{#1}%
1256 #2%
1257 \ifempty{#3}{-}{\frontmatter@footnote{#3}}%
1258 \par
1259 \endgroup
1260 }%
1261 }%

```

`\@author@present@script` This version of `\AU@opr` applies to the `superscriptaddress` class option. Need to add commas between groups of address numbers, which are passed in the macro `\@affilID@temp` in the form `{3}{4}{7}` if this set of authors is related to addresses, 3, 4 and 7.

```

1262 \def\@author@present@script#1#2{%
1263 \begingroup
1264 % \parskip\@author@parskip\relax
1265 \gdef\comma@space{\textsuperscript{,\,}}%
1266 % \ifx{\@affilID@temp\@empty}{-}%
1267 % \doauthor{#1}{#2}{-}%
1268 % }-%
1269 % \expandafter\set@count@\@affilID@temp}{-}\@nil
1270 % \ifnum{\count@=\z@}{-}%
1271 % \doauthor{#1}{#2}{-}%
1272 % }-%
1273 % \doauthor{#1}{#2}{-}%
1274 % \textsuperscript{\expandafter\@affilcomma\@affilID@temp\relax\relax}%
1275 % }%
1276 % }%
1277 % }%
1278 \doauthor{#1}{#2}{-}%
1279 \let\@tempa\@empty
1280 \expandafter\@affil@present@script\@affilID@temp\relax
1281 }%
1282 \endgroup
1283 \advance\@tempcnta\m@ne
1284 }%
1285 %\def\set@count@#1#2\@nil{%
1286 % \count@#1\relax
1287 %}%
1288 \def\@affilcomma#1#2{%
1289 \@ifx{\z@#1}{-}%
1290 \@ifx{\relax#2}{-}%
1291 \@affilcomma{#2}%
1292 }%
1293 }-%
1294 #1%
1295 \@ifx{\relax#2}{-}%
1296 \@ifx{\z@#2}{-}%
1297 \@affilcomma
1298 }-%
1299 ,\,\@affilcomma{#2}%

```

```

1300 }%
1301 }%
1302 }%
1303 }%
1304 \def\@affil@present@script#1{%
1305 \@ifx{\relax#1}{%
1306 \@ifx{\@tempa\@empty}{}%
1307 \textsuperscript{\expandafter\@affilcomma\@tempa\relax\relax}%
1308 }%
1309 }{%
1310 \@ifx{\z@#1}{\appdef\@tempa{#1}}%
1311 \@affil@present@script
1312 }%
1313 }%
1314 \@provide\@author@parskip{\z@skip}%

```

12.9.2 Authors and affiliations in groupedaddress style

`\frontmatter@author@produce@group` is an alias for `\frontmatter@author@produce`, the procedure that formats the author/affiliation list when `groupedaddress` is in effect.

In this case, the authors are being grouped above their shared addresses. How it works: the `\@AFG@list`, a list of all unique affiliation groups, is expanded. For each such group, all authors belonging to that group are formatted above the affiliation group. Collaborations are silently passed over.

This procedure must ensure that any paragraph that it starts gets ended finally.

```

1315 \def\frontmatter@author@produce@group{%
1316 \begingroup
1317 \let\@author@present\@author@present@group
1318 \frontmatter@authorformat
1319 \let\AFS@opr \affils@present@group
1320 \let\@listcomma\relax
1321 \@AFG@list
1322 \frontmatter@footnote@produce
1323 \par
1324 \endgroup
1325 \frontmatter@authorbelow
1326 }%
1327 \@provide\frontmatter@authorbelow{}%

```

`\affils@present@group` Alias of `\AFS@opr`, this procedure is used on every element of `\@AFG@list`, the list of unique affiliation groups, when formatting the author/affiliation block: It presents all authors sharing this affiliation group.

This procedure is called via the procedure `\frontmatter@author@produce@group`, an alias for `\frontmatter@author@produce`,

Its use pertains to the class options `groupedaddress`, `unsortedaddress`, and `runinaddress` (that is, `\groupauthors@sw` is true).

For each invocation, the entire `\@AAC@list` is run through (twice), making this process execute in N^2 time. (Is this really true?)

```
1328 \def\affils@present@group#1{%
```

Count (using `\@tempcnta`) the authors in the author list whose affiliation is #1.

Note that `\AF@temp` is used as a storage register for the argument of the procedure, for purposes of comparison using `\ifx`.

Note: here we use `\@tempcnta` to communicate accumulate the number of authors in the current affiliation set.

QUERY: does the value of `\AF@temp` and `\AF@opr` need to persist?

QUERY: what value does `\AU@opr` have at this point? ANSWER: the `\@affilID@count` and `\@affilID@match` procedures assign meanings to `\AU@opr` and `\CO@opr` dynamically. We initialize the two operators to `\undefined` so as to catch the pathological cases.

```
1329 \begingroup
1330   \def\AF@temp{#1}%           % 0B13
1331   \@tempcnta\z@
1332   \let\AU@opr \undefined     % 0B13
1333   \let\CO@opr \undefined     % 0B13
1334   \def\AF@opr{\@affilID@count\AF@temp\@tempcnta}% 0B13
1335   \@AAC@list
```

If no authors using this affiliation group, skip it.

```
1336   \@ifnum{\@tempcnta=\z@}{-}{-}%
```

DPC: If we have a list of length two, need to locally zap a comma.

```
1337   \begingroup
1338   \frontmatter@above@affilgroup
1339   \set@listcomma@count\@tempcnta
```

Run through the author list, presenting (with `\@author@present`) those authors whose affiliation matched the given one.

```
1340   \let\AU@opr \undefined     % 0B13
1341   \let\CO@opr \undefined     % 0B13
1342   \def\AF@opr{\@affilID@match\AF@temp}%
1343   \@AAC@list
1344   \endgroup
```

Now that the authors have all been presented, present the affiliations, grouped.

Note: `\@tempcnta` is used to count the number of affiliations for this set of authors.

```
1345   \begingroup
1346   \par
1347   \frontmatter@above@affiliation
1348   \frontmatter@affiliationfont
1349   \let\\frontmatter@addressnewline
1350   \@tempcnta\z@
1351   \@tfor\AF@temp:=#1\do{%
1352     \expandafter\@ifx\expandafter{\z@\AF@temp}{-}{-}%
1353     \advance\@tempcnta\@ne
```

```

1354     }%
1355 }%
1356 \@ifnum{\@tempcnta=\tw@}{%
1357   \let\@listcomma\relax
1358 }{}%
1359 \def\after@address{\@listcomma\ \@listand}%
1360 \runinaddress@sw{%
1361 }{%
1362   \tightenlines@sw{%
1363 }{%
1364   \parskip\z@ %space between affilations in grouped mode
1365 }%
1366 \appdef\after@address\par
1367 }%
1368 \let\AFF@opr \@affil@group
1369 \do@affil@fromgroup\@AFF@list#1\relax
1370 \endgroup

```

End of branch handling authors.

```

1371 }%
1372 \par
1373 \endgroup
1374 %\smallskip
1375 }%

```

`\@affilID@count` The control sequence name `\AF@opr` is placed in the author/affiliation list `\@AAC@list` for each (new) affiliation, with that affiliation as its argument.

The control sequence name `\AF@opr` is an alias of a procedure to count the number of authors at a given affiliation (`\@affilID@count`) or to present the given authors (`\@affilID@match`). These two procedures are executed when formatting under the `groupedaddress` class option.

```

1376 \def\@affilID@count#1#2#3{%
1377   \def\@tempifx{#3}%
1378   \@ifx{\@tempifx#1}{%
1379     \def\AU@opr{\@author@count#2}%
1380   }{%
1381     \let\AU@opr \@author@gobble
1382   }%
1383   \let\CO@opr \@collaboration@err
1384 }%
1385 \def\@affilID@match#1#2{%
1386   \def\@tempifx{#2}%
1387   \@ifx{\@tempifx#1}{%
1388     \let\AU@opr \@author@present
1389   }{%
1390     \let\AU@opr \@author@gobble
1391   }%
1392   \let\CO@opr \@collaboration@err
1393 }%

```


`\do@affil@fromgroup` Executes iteratively: selects the next address ID to print, and then re-execute the list of addresses to print the text of that address.

Note: an argument of `\relax` breaks out of this iteration, while an argument of `\z@` (`\noaffiliation`) is a no-op.

Note: we have created an N^2 computing process. FIXME: can use hashing instead, you know.

```
1394 \def\do@affil@fromgroup#1#2{%
1395   \@ifx{\relax#2}{-}%
1396   \count#2\relax
1397   \@ifnum{\count@=\z@}{-}{#1}%
1398   \do@affil@fromgroup#1%
1399 }%
1400 }%
```

`\@affil@group` The alias of `\AFF@opr` when the list `\@AFF@list` is executed by `\do@affil@fromgroup(groupedaddress)`: Print the address if its number matches `\count@` (value set by `\do@affil@fromgroup`).

Note that we detect a `\noaffiliation` here by the second parameter's being the token `\blankaffiliation`.

```
1401 \def\@affil@group#1#2#3{%
1402   \@ifnum{\count@=#1\relax}{-}%
1403   \@ifx{#2\blankaffiliation}{-}{-}%
1404   #2%
1405   \@ifempty{#3}{-}{-}%
1406   \frontmatter@footnote{#3}%
1407 }%
1408 \after@address
1409 }%
1410   \advance\@tempcnta\m@ne
1411 }{}%
1412 }%
```

`\@author@present@group` This version of `\AU@opr` applies to the `groupedaddress` class option. Traverse the list calling the `\doauthor` hook on each author.

```
1413 \def\@author@present@group#1#2{%
1414   \gdef\comma@space{\gdef\comma@space{\textsuperscript{\,}}}%
1415   \doauthor{#1}{#2}{-}%
1416   \advance\@tempcnta\m@ne
1417 }%
```

`\@pacs@produce` PACS, keywords and dates.

```
1418 \def\@pacs@produce#1{%
1419   \showPACS@sw%
1420   \begingroup
1421   \frontmatter@PACS@format
1422   \@pacs@name#1\par
1423   \endgroup
1424 }{}%
1425   \@ifempty{#1}{-}{-}%
```

```

1426   \class@warn{\PACS@warn}%
1427   }%
1428   }%
1429 }%
1430 \def\PACS@warn{If you want your PACS to appear in your output, use document class option showpa

```

\@keywords@produce

```

1431 \def\@keywords@produce#1{%
1432   \showKEYS@sw{%
1433     \begingroup
1434     \frontmatter@keys@format
1435     \@keys@name#1\par
1436   \endgroup
1437 }{%
1438   \@ifempty{#1}{}{%
1439     \class@warn{If you want your keywords to appear in your output, use document class option sh
1440   }%
1441 }%
1442 }%

```

`\frontmatter@footnote@produce@footnote` Produce any footnotes to appear at the bottom of the title page.
`\frontmatter@footnote@produce@endnote` If frontmatter footnotes have been redirected to the bibliography, this will be a no-op. ref.: `\present@bibnote`.

```

1443 \def\frontmatter@footnote@produce@footnote{%
1444   \let\@TBN@opr\present@FM@footnote
1445   \@FMN@list
1446   \global\let\@FMN@list\@empty
1447 }%
1448 \def\present@FM@footnote#1#2{%
1449   \begingroup
1450   \csname c@\@mpfn\endcsname#1\relax
1451   \def\@thefnmark{\thempfn}%
1452   \frontmatter@footnotetext{#2}%
1453 \endgroup
1454 }%
1455 \def\frontmatter@footnote@produce@endnote{%
1456 }%

```

`\frontmatter@thefootnote` The in the title block, the footnote symbol (used for alternate affiliation and sundry) is a `\fnsymbol` or a lowercase letter, as selected by a boolean.

```

1457 \def\frontmatter@thefootnote{%
1458   \altaffilletter@sw{\@alph}{\fnsymbol}\c@footnote
1459 }%

```

`\frontmatter@makefnmark` The default procedure for setting the footnote mark within the frontmatter. Journals will override this procedure.

```

1460 \def\frontmatter@makefnmark{%
1461   \@textsuperscript{%
1462     \normalfont\@thefnmark

```

```
1463 }%
1464 }%
```

`\frontmatter@makefntext` This procedure is used when setting footnotes within the title block.

```
1465 \long\def\frontmatter@makefntext#1{%
1466 \parindent 1em
1467 \noindent
1468 \Hy@raisedlink{\hyper@anchorstart{frontmatter@the\c@footnote}\hyper@anchorend}%
1469 \@makefnmark
1470 #1%
1471 }%
```

`\frontmatter@setup` The default type specification for the title page. Journals will override this definition.

```
1472 \def\frontmatter@setup{}
```

`\frontmatter@RRAPformat` The procedure `\frontmatter@RRAPformat` is the formatting procedure for the `\punct@RRAP` “Received, Revised, etc.” block on the title page. The macro `\punct@RRAP` produces the punctuation between the entries. Journals will override these two definitions.

The procedure `\produce@RRAP` is fairly general, and should be used by most journal substyles.

The procedure `\frontmatter@RRAP@format` will be overridden by the journal.

```
1473 \def\frontmatter@RRAPformat#1{%
1474 \removelastskip
1475 \begingroup
1476 \frontmatter@RRAP@format
1477 #1\par
1478 \endgroup
1479 }%
1480 \def\punct@RRAP{; }%
1481 \def\produce@RRAP#1{%
1482 \@ifempty{#1}{}%
1483 \@ifvmode{\leavevmode}{\unskip\punct@RRAP\ignorespaces}%
1484 #1%
1485 }%
1486 }%
```

`\frontmatter@authorformat` The default type specification for the author list. Journals will override this definition.

```
1487 \def\frontmatter@authorformat{}
```

`\frontmatter@above@affilgroup` The default amount of space above an affiliation group (in a `\affils@present@group` production). Journals will override this definition.

```
1488 \def\frontmatter@above@affilgroup{}
```

`\frontmatter@above@affiliation` The `\frontmatter@above@affiliation` is the amount of space above affiliations in the `groupedaddress` style, and `\frontmatter@above@affiliation@script` is that for `superscriptaddress`. Journals will override this definition.

```

1489 \def\frontmatter@above@affiliation{}%
1490 \def\frontmatter@above@affiliation@script{}%

\frontmatter@affiliationfont The default type specification for the affiliation. Journals will override this definition.
1491 \def\frontmatter@affiliationfont{}%

\frontmatter@RRAP@format The default type specification for the dates. Journals will override this definition.
1492 \def\frontmatter@RRAP@format{}%

\frontmatter@PACS@format Specify the formatting of the title page PACS statement.
Journals will override.
1493 \def\frontmatter@PACS@format{}%

\frontmatter@keys@format Specify the formatting of the title page keywords statement.
Journals will override.
1494 \def\frontmatter@keys@format{}%

\frontmatter@finalspace
1495 \def\frontmatter@finalspace{\addvspace{18\p@}}

\frontmatter@addressnewline The definition of \\ for address handling. Default puts all the ‘lines’ on a run-in
line, separated by comma and space. DPC: was
space between lines of address.
1496 \def\frontmatter@addressnewline{%
1497 \@ifhmode{\skip@ \lastskip \unskip \unpenalty \break \hskip \skip@}{}%
1498 % was: \vskip-.5ex
1499 }%

\frontmatter@preabstractspace Space above and space below abstract in title block
\frontmatter@postabstractspace 1500 \def\frontmatter@preabstractspace{5.5\p@}
1501 \def\frontmatter@postabstractspace{6.5\p@}

\aftermaketitle@chk Error-checking code.
1502 \def\aftermaketitle@chk#1{%
1503 \@ifx{\maketitle\relax}{}%
1504 \class@err{\protect#1 must be used before \protect\maketitle}%
1505 }{}%
1506 }%

\ps@titlepage Default page style for title page. Journals will override this procedure.
1507 \def\ps@titlepage{\ps@empty}%

    FIXME: there is a limitation to the default meaning of \@startpage, the label
    “FirstPage” is only defined if the document has a \maketitle command.

1508 \def\volumeyear#1{\gdef\@volumeyear{#1}}%
1509 \def\@volumeyear{}%
1510 \def\volumentnumber#1{\gdef\@volumenumber{#1}}%

```

```

1511 \def\@volumenumber{}%
1512 \def\issuenum#1{\gdef\@issuenum{#1}}%
1513 \def\@issuenum{}%
1514 \def\eid#1{\gdef\@eid{#1}}%
1515 \def\@eid{}%
1516 %
1517 \def\startpage#1{\gdef\@startpage{#1}\c@page#1\relax}%
1518 \def\@startpage{\pageref{FirstPage}}%
1519 \def\endpage#1{\gdef\@endpage{#1}}%
1520 \def\@endpage{\pageref{LastPage}}%

```

12.10 Printing out the “list-of” elements

FIXME: The `\appendix@toc` procedure should change the meaning of `\l@section` so that the `\sections` can be appropriately formatted, reflecting their status as appendices.

```

1521 \def\print@toc#1{%
1522 \begingroup
1523 % \c@secnumdepth-\maxdimen
1524 \expandafter\section
1525 \expandafter*%
1526 \expandafter{%
1527 \csname#1name\endcsname
1528 }%
1529 \let\appendix\appendix@toc
1530 \@starttoc{#1}%
1531 \endgroup
1532 }%
1533 \def\appendix@toc{}%

```

13 Body

13.1 counters

The following definitions are probably identical to those in `classes.dtx`

```

1534 \def\labelenumi{\theenumi.}
1535 \def\theenumi{\arabic{enumi}}

1536 \def\labelenumii{(\theenumii)}
1537 \def\theenumii{\alph{enumii}}
1538 \def\p@enumii{\theenumi}

1539 \def\labelenumiii{\theenumiii.}
1540 \def\theenumiii{\roman{enumiii}}
1541 \def\p@enumiii{\theenumi(\theenumii)}

1542 \def\labelenumiv{\theenumiv.}
1543 \def\theenumiv{\Alph{enumiv}}
1544 \def\p@enumiv{\p@enumiii\theenumiii}

```

```

1545 \def\labelitemi{\textbullet}
1546 \def\labelitemii{\normalfont\bfseries\textendash}
1547 \def\labelitemiii{\textasteriskcentered}
1548 \def\labelitemiv{\textperiodcentered}
1549 \pagenumbering{arabic}

```

13.2 float parameters

from the old aps.sty. (DPC: same as article I think) AO: here, L^AT_EX's standard classes fail very poorly (the price of backward compatability): the values for `\floatpagefraction` and `\dblfloatpagefraction` need to be raised to avoid creating extremely short float pages.

```

1550 \setcounter{topnumber}{2}
1551 \def\topfraction{.9}
1552 \setcounter{bottomnumber}{1}
1553 \def\bottomfraction{.9}
1554 \setcounter{totalnumber}{3}
1555 \def\textfraction{.1}
1556 \def\floatpagefraction{.9}
1557 \setcounter{dbltopnumber}{2}
1558 \def\dbltopfraction{.9}
1559 \def\dblfloatpagefraction{.9}

```

13.3 List Environments

```

1560 \newenvironment{verse}{%
1561   \let\@=\@centercr
1562   \list{}{%
1563     \itemsep\z@ \itemindent -1.5em\listparindent \itemindent
1564     \rightmargin\leftmargin\advance\leftmargin 1.5em}\item[]%
1565 }{%
1566 \endlist
1567 }%

1568 \newenvironment{quotation}{%
1569   \list{}{%
1570     \listparindent 1.5em
1571     \itemindent\listparindent
1572     \rightmargin\leftmargin \parsep \z@ \@plus\p@\item[]%
1573 }{%
1574 \endlist
1575 }%

1576 \newenvironment{quote}{%
1577   \list{}{%
1578     \rightmargin\leftmargin}\item[]%
1579 }{%
1580 \endlist
1581 }%

```

```

1582 \def\descriptionlabel#1{%
1583   \hspace\labelsep \normalfont\bfseries #1%
1584 }%

1585 \newenvironment{description}{%
1586   \list{}{%
1587     \labelwidth\z@ \itemindent-\leftmargin
1588     \let\makelabel\descriptionlabel
1589   }%
1590 }{%
1591 \endlist
1592 }%

```

13.4 Sectioning Commands

13.4.1 Counters and Their Productions

```

1593 \newcounter{part}
1594 \newcounter{section}
1595 \newcounter{subsection}[section]
1596 \newcounter{subsubsection}[subsection]
1597 \newcounter{paragraph}[subsubsection]
1598 \newcounter{subparagraph}[paragraph]

1599 \def\thepart      {\Roman{part}} %
1600 \def\thesection  {\Roman{section}}
1601 \def\p@section   {}
1602 \def\thesubsection {\Alph{subsection}}
1603 \def\p@subsection {\thesection\,}
1604 \def\thesubsubsection {\arabic{subsubsection}}
1605 \def\p@subsubsection {\thesection\,\thesubsection\,}
1606 \def\theparagraph {\alph{paragraph}}
1607 \def\p@paragraph  {\thesection\,\thesubsection\,\thesubsubsection\,}
1608 \def\thesubparagraph {\arabic{subparagraph}}
1609 \def\p@subparagraph {\thesection\,\thesubsection\,\thesubsubsection\,\theparagraph\,}

```

13.4.2 The Acknowledgments Environment

This user-level markup produces a head introducing the acknowledgments, and acts as a wrapper for the text. In this implementation, it is an unnumbered section, but appears within the toc.

For compatibility's sake, we implement it under the alternative spelling `acknowledgements`.

```

1610 \newenvironment{acknowledgments}{%
1611   \acknowledgments@sw{%
1612     \section*{\acknowledgmentsname}%
1613   }{%
1614     \par
1615     \phantomsection
1616     \addcontentsline{toc}{section}{\protect\numberline{}\acknowledgmentsname}%
1617   }%
1618 }{%

```

```

1619 \par
1620 }%
1621 \@booleantrue\acknowledgments@sw
1622 \newenvironment{acknowledgements}{%
1623 \replace@environment{acknowledgements}{acknowledgments}%
1624 }{%
1625 \endacknowledgments
1626 }%

```

13.4.3 Part Opener

section setup copied verbatim from revtex3 aps/osa. Does not explicitly depend on pointsize options.

```

1627 \def\part{\par
1628 \addvspace{4ex}%
1629 \@afterindentfalse
1630 \secdef\@part\@spart}%

1631 \def\@part[#1]#2{%
1632 \@ifnum{\c@secnumdepth >\m@ne}{%
1633 \refstepcounter{part}%
1634 \addcontentsline{toc}{part}{\thepart\hspace{1em}#1}%
1635 }{%
1636 \addcontentsline{toc}{part}{#1}%
1637 }%
1638 \begingroup
1639 \parindent \z@ \raggedright
1640 \interlinepenalty\@M
1641 \@ifnum{\c@secnumdepth >\m@ne}{%
1642 \Large \bf \partname~\thepart%
1643 \par\nobreak
1644 }{}%
1645 \huge \bf
1646 #2%
1647 \markboth{}{}\par
1648 \endgroup
1649 \nobreak
1650 \vskip 3ex
1651 \@afterheading
1652 }%

1653 \def\@spart#1{{\parindent \z@ \raggedright
1654 \interlinepenalty\@M
1655 \huge \bf
1656 #1\par}
1657 \nobreak
1658 \vskip 3ex
1659 \@afterheading}

```


13.4.4 Stacked Heads

Here are the class default definitions for sectioning commands. A society or a journal substyle will likely override these definitions.

In doing so, you can customize the formatting for a particular level by defining, e.g., `\@hangfrom@section` or `\@subsectioncntformat`.

```
1660 \def\section{%
1661   \@startsection
1662   {section}%
1663   {1}%
1664   {\z@}%
1665   {0.8cm \@plus1ex \@minus .2ex}%
1666   {0.5cm}%
1667   {\normalfont\small\bfseries}%
1668 }%

1669 \def\subsection{%
1670   \@startsection
1671   {subsection}%
1672   {2}%
1673   {\z@}%
1674   {.8cm \@plus1ex \@minus .2ex}%
1675   {.5cm}%
1676   {\normalfont\small\bfseries}%
1677 }%

1678 \def\subsubsection{%
1679   \@startsection
1680   {subsubsection}%
1681   {3}%
1682   {\z@}%
1683   {.8cm \@plus1ex \@minus .2ex}%
1684   {.5cm}%
1685   {\normalfont\small\itshape}%
1686 }%
```

13.4.5 Runin Heads

```
1687 \def\paragraph{%
1688   \@startsection
1689   {paragraph}%
1690   {4}%
1691   {\parindent}%
1692   {\z@}%
1693   {-1em}%
1694   {\normalfont\normalsize\itshape}%
1695 }%

1696 \def\subparagraph{%
1697   \@startsection
1698   {subparagraph}%
```

```

1699     {5}%
1700     {\parindent}%
1701     {3.25ex \@plus1ex \@minus .2ex}%
1702     {-1em}%
1703     {\normalfont\normalsize\bfseries}%
1704 }%

```

13.5 Math

`\theequation` We change the production of the equation counter so that we can accommodate the `eqsecnum` option.

```

1705 \def\theequation{%
1706 \theequation@prefix\arabic{equation}%
1707 }%
1708 \def\theequation@prefix{%

```

13.6 Type Size-Dependent Settings

Note that many parameters, as well as the meaning of `\normalsize`, are deferred until `\AtEndOfClass` time. Therefore, code elsewhere in this class *should not* assume these things' values have been set!

```

1709 \AtEndOfClass{%
1710 \expandafter\input\expandafter{\@pointsize pt\substyle@ext}%
1711 }%

```

13.7 All Point Sizes

```

1712 \setcounter{secnumdepth}{4}
1713 \lineskip 1pt
1714 \normallineskip 1pt
1715 \def\baselinestretch{1}%
1716 \@lowpenalty 51
1717 \@medpenalty 151
1718 \@highpenalty 301
1719 \@beginparpenalty -\@lowpenalty
1720 \@endparpenalty -\@lowpenalty
1721 \@itempenalty -\@lowpenalty
1722 \arraycolsep 3pt
1723 \tabcolsep 2pt
1724 \arrayrulewidth .4pt
1725 \doublerulesep 2pt
1726 \skip\@mpfootins = 0pt
1727 \fboxsep = 3.0pt
1728 \fboxrule = 0.4pt

```

13.8 Figures

`figure` We define the `figure` environment. Later, we will horse around with its meaning in order to accomodate `\floats@sw`.

```
1729 \newenvironment{figure}
1730         {\@float{figure}}
1731         {\end@float}
1732 \newenvironment{figure*}
1733         {\@dblfloat{figure}}
1734         {\end@dblfloat}
```

`\@makecaption` If caption is one line long, to be centered; if lines turn, then set justified.

```
1735 \newlength\abovecaptionskip
1736 \newlength\belowcaptionskip
1737 \setlength\abovecaptionskip{10\p@}
1738 \setlength\belowcaptionskip{2\p@}

1739 \long\def\@makecaption#1#2{%
1740   \par
1741   % \nobreak
1742   \vskip\abovecaptionskip
1743   \begingroup
1744   \small\rmfamily
1745   \sbox\@tempboxa{%
1746     \let\\\heading@cr
1747     #1: #2%
1748   }%
1749   \@ifdim{\wd\@tempboxa >\hsize}{%
1750     \begingroup
1751     \samepage
1752     \flushing
1753     \let\footnote\@footnotemark@gobble
1754     #1: #2\par
1755   \endgroup
1756   }{%
1757     \global \@minipagefalse
1758     \hb@xt@\hsize{\hfil\unhbox\@tempboxa\hfil}%
1759   }%
1760 \endgroup
1761 \vskip\belowcaptionskip
1762 }%
1763 \def\@footnotemark@gobble{%
1764 \@footnotemark
1765 \@ifnextchar[{\@gobble@opt@i}{\@gobble}%
1766 }%
1767 \def\@gobble@opt@i[#1]#2{%
1768 \def\@mpmakefntext#1{%
1769 \flushing
1770 \parindent=1em
1771 \noindent
```

```

1772 \hb@xt@1em{\hss\@makefnmark}%
1773 #1%
1774 }%

```

`\thefigure` The figure counter and float placement defaults.

```

1775 \newcounter{figure}
1776 \renewcommand \thefigure {\@arabic\c@figure}

```

Note that we give the ‘!’ modifier by default. This is an effort to avoid the syndrome wherein a deferred float finds itself unqualified for placement, thereby getting carried until `\clearpage`.

```

1777 \def\fps@figure{tbp}
1778 \def\ftype@figure{1}
1779 \def\ext@figure{lof}
1780 \def\fnm@figure{\figurename~\thefigure}

```

13.8.1 Deferring figure Floats

We install a hook at `\AtBeginDocument` time which determines if figures will float or will be deferred until `\printfigures` time.

```

1781 \appdef\class@documenthook{%
1782 \do@if@floats{figure}{.fgx}%
1783 }%
1784 \appdef\class@enddocumenthook{%
1785 \printfigures\relax
1786 }%

```

`\printfigures` The user-level command `\printfigures` determines where the figures are to appear in a document in which `\floats@sw` is false. If the user invokes the `endfloats` class option and fails to insert a `\printfigures` command, the figures will be printed at the end of the document. If the command is given, but floats are not being deferred, it amounts to a no-op.

```

1787 \newcommand\printfigures{%
1788 \@ifstar{\true@sw}{\floatp@sw{\true@sw}{\false@sw}}%
1789 {%
1790 \print@float{figure}{\oneapage}%
1791 }{%
1792 \print@float{figure}{}%
1793 }%
1794 }%

```

`\@xfloat@prep` We patch into the procedure `\@xfloat@prep`. This patch applies to all floats (not figure alone) and makes the type center.

```

1795 \appdef\@xfloat@prep{%
1796 \appdef\@parboxrestore{\centering}%
1797 \let\@makefnmark\@makefnmark@latex
1798 \let\@footnotemark\@footnotemark@latex
1799 }%

```

13.9 Tables

DPC: More or less taken from `revtex2 aps.sty`, but using `dcolumn` for decimal alignment.

`table` We define the `table` environment. Later, we will horse around with its meaning in order to accomodate `\floats@sw`.

```
1800 \newenvironment{table}
1801         {\@float{table}}
1802         {\end@float}
1803 \newenvironment{table*}
1804         {\@dblfloat{table}}
1805         {\end@dblfloat}
```

`\thetable` Table counter and default float placement declarations.

```
1806 \newcounter{table}
1807 \renewcommand\thetable{\@Roman\c@table}
```

Note that we give the ‘!’ modifier by default. This is an effort to avoid the syndrome wherein a deferred float finds itself unqualified for placement, thereby getting carried until `\clearpage`.

```
1808 \def\fps@table{tbp}
1809 \def\ftype@table{2}
1810 \def\ext@table{lot}
1811 \def\fnm@table{\tablename~\thetable}
```

`\table@hook` Assign a meaning to the hook installed into float processing.

`\squeezetable` By default floats are `\small`. The `\squeezetable` declaration makes them smaller (`\scriptsize`). In general you can locally redefine `\table@hook` to be whatever you like. (DPC: `\Huge\color{magenta}...`?)

```
1812 \def\table@hook{\small}%
1813 \def\squeezetable{\def\table@hook{\scriptsize}}%
1814 \appdef\@floatboxreset{\table@hook}%
```

13.9.1 Deferring table Floats

We install a hook at `\AtBeginDocument` time which determines if tables will float or will be deferred until `\printtables` time.

We also deal with the possibility of `longtable` environments.

```
1815 \appdef\class@documenthook{%
1816 \floats@sw}{-%
1817 \let@environment{longtable@float}{longtable}%
1818 \let@environment{longtable}{longtable@write}%
1819 \let@environment{longtable*@float}{longtable*}%
1820 \let@environment{longtable*}{longtable*@write}%
1821 \let@environment{turnpage@float}{turnpage}%
1822 \let@environment{turnpage}{turnpage@write}%
1823 }%
1824 \do@if@floats{table}{.tbx}%
```

```

1825 }%
1826 \appdef\class@enddocumenthook{%
1827 \printtables\relax
1828 }%
1829 \newenvironment{longtable@write}{%
1830 \write@float{longtable}{table}%
1831 }{%
1832 \endwrite@float
1833 }%
1834 \newenvironment{longtable*@write}{%
1835 \write@float{longtable*}{table}%
1836 }{%
1837 \endwrite@float
1838 }%
1839 \newenvironment{turnpage@write}{%
1840 \immediate\write\tablewrite{\string\begin{turnpage}}%
1841 }{%
1842 \immediate\write\tablewrite{\string\end{turnpage}}%
1843 }%

```

`\printtables` The user-level command `\printtables` determines where the tables are to appear in a document in which `\floats@sw` is false. If the user invokes the `nofloats` and fails to insert a `\printtables` command, the tables will be printed at the end of the document. If the command is given, but floats are not being deferred, it amounts to a no-op.

```

1844 \newcommand\printtables{%
1845 \begingroup
1846 \let@environment{longtable}{longtable@float}%
1847 \let@environment{longtable*}{longtable*@float}%
1848 \let@environment{turnpage}{turnpage@anchored}%
1849 \prepdef\longtable{\trigger@float@par}%
1850 \expandafter\prepdef\csname longtable*\endcsname{\trigger@float@par}%
1851 \expandafter\prepdef\csname table@floats\endcsname{%
1852 \onecolumngrid@push
1853 }%
1854 \expandafter\appdef\csname endtable@floats\endcsname{%
1855 \onecolumngrid@pop
1856 }%
1857 \@ifstar{\true@sw}{\floatp@sw{\true@sw}{\false@sw}}%
1858 {%
1859 \print@float{table}{\onepage}%
1860 }{%
1861 \print@float{table}{}%
1862 }%
1863 \endgroup
1864 }%
1865 \newenvironment{turnpage@anchored}{%
1866 \onecolumngrid@push
1867 \setbox\z@\vbox to\textwidth\bgroup

```

```

1868 \columnwidth\textheight
1869 }{%
1870 \vfil
1871 \egroup
1872 \rotatebox{90}{\box\z@}%
1873 \onecolumngrid@pop
1874 }%

```

14 Tabular

Every tabular has a double (Scotch) rule above and below. The column specifier “d” is implemented using the dcolumn package, if available. FIXME: always load dcolumn!

```

\tabular@hook
\endtabular@hook 1875 \def\endtabular@hook{}%
ruledtabular 1876 %\RequirePackage{dcolumn}%
1877 \appdef\class@documenthook{%
1878 \@ifpackageloaded{dcolumn}{%
1879 \newcolumnstype{d}{D{.}{.}{-1}}%
1880 }{}%
1881 }%
1882 \def\toprule{\hline\hline}%
1883 \def\colrule{\hline}%
1884 \def\botrule{\hline\hline}%
1885 \newenvironment{ruledtabular}{%
1886 \def\array@default{v}%
1887 \appdef\tabular@hook{\def\@halignto{to\hsize}}%
1888 \let\tableleft@skip@default\tableleft@skip
1889 \let\tableleft@skip\tableleft@skip@float
1890 \let\tablemid@skip@default\tablemid@skip
1891 \let\tablemid@skip\tablemid@skip@float
1892 \let\tableright@skip@default\tableright@skip
1893 \let\tableright@skip\tableright@skip@float
1894 \let\array@row@pre@default\array@row@pre
1895 \let\array@row@pre\array@row@pre@float
1896 \let\array@row@pst@default\array@row@pst
1897 \let\array@row@pst\array@row@pst@float
1898 \appdef\array@row@rst{%
1899 \let\array@row@pre\array@row@pre@default
1900 \let\array@row@pst\array@row@pst@default
1901 \let\tableleft@skip\tableleft@skip@default
1902 \let\tablemid@skip\tablemid@skip@default
1903 \let\tableright@skip\tableright@skip@default
1904 \appdef\tabular@hook{\let\@halignto\@empty}%
1905 }%
1906 }{%
1907 }%

```

15 Footnote Text

```
\@makefntext
1908 \def\@makefntext#1{%
1909   \def\baselinestretch{1}%
1910   \reset@font\footnotesize
1911   \parindent 1em%
1912   \noindent
1913   \hb@xt@1.8em{%
1914     \Hy@raisedlink{\hyper@anchorstart{footnote@the\c@footnote}\hyper@anchorend}%
1915     \hss\@makefnmark
1916   }%
1917   #1\par
1918 }%
```

15.1 Citations, Bibliography, Endnotes

15.1.1 Bibliography

Load Patrick Daly's `natbib` package, <ftp://ctan.tug.org/macros/latex/contrib/supported/natbib>

Note that `natbib` assumes that it loads over a document class, such as the `article` class, that has already defined `thebibliography` and `\@listi`.

Note also that `natbib` also installs a command `\NAT@set@cites` into `\AtBeginDocument` which presumes that the proper `\bibpunct` command has been issued.

We have a problem with `natbib` in that it does not accomodate late binding of its package options. This means that those options must be known at the time the package loads. Therefore, we select `sort&compress` now, and thereby foreclose on alternative uses of `natbib`.

Certain societies may prefer an alternative; they are out of luck. If you find yourself in this position, please let the author of `natbib` know that his package should be modified to accomodate late binding of package options.

To remedy the situation, note that the macro `\NAT@sort` controls whether citations are left alone (`\NAT@sort=0`), sorted (`\NAT@sort=1`), or sorted and compressed (`\NAT@sort=2`). Since we give `natbib` the `sort&compress` option, if you prefer `sort`, you need only define `\NAT@sort` to be 1. However, if you prefer the effect of having neither `sort` nor `sort&compress`, you must define `\NAT@sort` to be 0 and you must also define `\NAT@sort@cites`:

```
%\renewcommand\NAT@sort@cites[1]{\edef\NAT@cite@list{#1}}%
%
```

For other `natbib` customizations, you may proceed as if you were going to use the `natbib.cfg` file: anything that you can modify by this means is fair game. Once REVTeX is finished loading, you can assert any definitions for `natbib` that you wish.

```
1919 \newenvironment{thebibliography}{}{}%
```



```

1920 \let\@listi\@empty
1921 \RequirePackage[sort&compress]{natbib}[1999/05/28 7.0]%
1922 \let\NAT@thebibliography\thebibliography
1923 \let\NAT@endthebibliography\endthebibliography
1924 \let\bibliographystyle@latex\bibliographystyle

```

`\NAT@citesuper` We redefine `natbib`'s procedure `\NAT@citesuper`, which is executed when setting a superscript citation. The `\hspace` is removed: in any case, it should really be `\hspace*`, to prevent an unwanted pagebreak.

```

1925 \renewcommand\NAT@citesuper[3]{%
1926 \ifNAT@swa
1927 \leavevmode
1928 \unskip
1929 % \hspace{1\p@}%
1930 \textsuperscript{#1}%
1931 \if*#3*\else\ (#3)\fi
1932 \else
1933 #1%
1934 \fi
1935 \endgroup
1936 }%

```

`\@makefnmark@cite` We define a procedure that will set a footnote mark the same way that a citation is set. If footnotes are put in the bibliography with `\footinbib@sw`, then the corresponding mark should look the same as the result of a `\cite`. This is how we do it.

```

1937 \def\@makefnmark@cite{\begingroup\NAT@swatrue\@cite{\@thefnmark}}{-}{-}%

```

`\bibliographystyle` We arrange for the selection of bibliography style to occur either due to the document's explicit `\bibliographystyle` statement or via the journal substyle.

Note that REVT_EX is now incompatible with any package that patches `\bibliographystyle`, except for those (like `natbib`) that load before here.

```

1938 \let\bibliographystyle@latex\bibliographystyle
1939 \def\bibliographystyle{\def\@bibstyle}%

```

`\bibsection` We define the sectioning command to use when starting the bibliography and gently coax `natbib` into using the formatting procedures that *we* want it to use.

`\NAT@bibsetnum` This way of setting up `thebibliography` automatically sets the label width based on the largest number used within the bibliography. This scheme will not work properly using the author/year style of bib entry, though.

`\NAT@bibsetup` We define `\bibnumfmt` to be `\place@bibnumber`, which is a macro managed by REVT_EX. If the document defines `\bibnumfmt`, then that definition will be used instead, which is what the `natbib` package gives as its programming interface.

`\bibpreamble` And if the substyle does not give a meaning to `\place@bibnumber`, we give it that of the original `\bibnumfmt`.

```

1940 \def\bibsection{%
1941 \@ifx@empty\refname{%
1942 \par

```

```

1943 }{%
1944 \let\@changfromsection\@changfroms
1945 \section*{\refname}%
1946 \@nobreaktrue
1947 }%
1948 }%
1949 \let\NATx@bibsetnum\NAT@bibsetnum
1950 \def\NAT@bibsetnum#1{%
1951 \setlength{\topsep}{\z@}%
1952 \NATx@bibsetnum{\ref{LastBibItem}}}%
1953 }%
1954 \let\NATx@bibsetup\NAT@bibsetup
1955 \def\NAT@bibsetup{%
1956 \setlength{\labelwidth}{\z@}%
1957 \setlength{\labelsep}{\z@}%
1958 \setlength{\itemindent}{\z@}%
1959 \setlength{\listparindent}{\z@}%
1960 \setlength{\topsep}{\z@}%
1961 \setlength{\parsep}{\z@}%
1962 \NATx@bibsetup
1963 }%
1964 \let\bibpreamble\@empty
1965 \def\newblock{\ }%
1966 \let\NATx@bibnumfmt\bibnumfmt
1967 \def\bibnumfmt{\place@bibnumber}%
1968 \AtEndOfClass{%
1969 \appdef\class@documenthook{%
1970 \@ifxundefined\place@bibnumber{%
1971 \let\place@bibnumber\NATx@bibnumfmt
1972 }{}}%
1973 }%
1974 }%

```

`\NAT@onlinecite` We anticipate using numerical citations. If superscript citations are used, we nonetheless need a way to use numerical citations as required by the author. These should be accessible via the `\citet` command.

Therefore we remember how to do a numerical citation even when the superscript citation has been selected.

Can you say “inelegant hack”? I knew you could!

```

1975 \let\NAT@citeyear\citeyear
1976 \def\NAT@onlinecite#1{%
1977 \begingroup
1978 \let\@cite\NAT@citenum
1979 \let\NAT@mbbox\mbox
1980 \let\citeyear\NAT@citeyear
1981 \def\NAT@space{ }%
1982 \cite{#1}%
1983 \endgroup
1984 }%

```

+ We extend `natbib`'s syntax with two commands to set a citation on the baseline (`\textcite` as opposed to superscripted) and as text (rather than parenthetical), respectively. A journal substyle that makes citations be superscripted or parenthetical as the case may be, should ensure that the author has continued access to these two styles.

```
1985 \appdef\class@inithook{%
1986 \@ifxundefined\@onlinecite{\def\@onlinecite{\citealp}}{}}%
1987 \@ifxundefined\@textcite{\def\@textcite{\citete}}{}}%
1988 }%
1989 \DeclareRobustCommand\onlinecite{\@onlinecite}%
1990 \DeclareRobustCommand\textcite{\@textcite}%
```

`thebibliography` We put a tail patch into `\thebibliography` and a headpatch into `\endthebibliography`.
`\present@bibnote` We also apply a fix to the `\list` procedure so that, at least within the bibliography, items are not formatted via `\parshape`, which caused problems during column balancing. (Other list-like environments may also require fixing, but we will save that for another day.)

Here we provide a default treatment for frontmatter notes deferred to the bibliography; a journal substyle might want to override the definition of `\present@bibnote`.

```
1991 \renewenvironment{thebibliography}[1]{%
1992 \NAT@thebibliography{#1}%
1993 \@clubpenalty\clubpenalty
1994 \let\@TBN@opr\present@bibnote
1995 \@FMN@list
1996 }{%
1997 \@endnotesinbib
1998 \edef\@currentlabel{\arabic{NAT@ctr}}%
1999 \label{LastBibItem}%
2000 \NAT@endthebibliography
2001 \global\let\auto@bib\@empty
2002 }%
2003 \def\present@bibnote#1#2{%
2004 \item[%
2005 \textsuperscript{%
2006 \normalfont
2007 \Hy@raisedlink{\hyper@anchorstart{frontmatter@#1}\hyper@anchorend}%
2008 \begingroup
2009 \c@footnote#1\relax
2010 \frontmatter@thefootnote
2011 \endgroup
2012 }%
2013 ]#2\par
2014 }%
```

`\place@bibnumber@sup` For producing the `\bibitem` device, we define two procedures to select from.

`\place@bibnumber@inl` Note that we could have used `natbib`'s `\ifNAT@super` switch, but it does not allow for altering the meaning of `\bibnumfmt`.

```
2015 \def\place@bibnumber@sup#1{\textsuperscript{#1}}%
2016 \def\place@bibnumber@inl#1{[#1]}%
```

`\@cite` We wish to delay committing the `\bibliographystyle` until as late as possible.
`\nocite` The journal substyle will define a default bibliography style, and the document's
`write@bibliographystyle` explicit `\bibliographystyle` command, if any, will override that default. For the sake of Bib_T_EX, we must execute the `\bibliographystyle` command (putting a `\bibstyle` command into the auxiliary file) somewhere before the first `\cite` command (or any other like command), which puts a `\citation` command into the auxiliary file.

Therefore, we headpatch the two procedures in `natbib` that can result in the appearance in the auxiliary file of a `\citation` command. These two procedures are `\@cite` and `\nocite`.

Not!

The `\bibstyle` command may appear quite late in the `revtex4.dtx.aux` file. We now delay the automatic writing of the `\bibstyle` command to the end of the job.

The procedure `\write@bibliographystyle` tests whether a `\bibliographystyle` command has already been given. If not, it effectively executes the needed `\bibliographystyle` command, then neutralizes itself (we only need to do this once per job).

```
2017 %\AtBeginDocument{%
2018 % \let\natbib@cite\@cite
2019 % \def\@citef\write@bibliographystyle\natbib@cite}%
2020 % \let\natbib@nocite\nocite
2021 % \def\nocitef\write@bibliographystyle\natbib@nocite}%
2022 %}%
2023 \def\write@bibliographystylef%
2024 \@ifxundefined\@bibstyle}{f}%
2025 \expandafter\bibliographystyle@latex\expandafter{\@bibstyle}%
2026 }%
2027 \global\let\write@bibliographystyle\relax
2028 }%
2029 \AtEndDocument{\write@bibliographystyle}%
```

`\super@cite` The `\super@cite` procedure takes the place of `\@citex` and implements the feature of the `citeautoscript` class option. This means that the document should be marked up as if citations were *not* superscripted, and then if you select a journal substyle that has superscripted citations, REVT_EX will do its best to alter the formatting of the `\cites` to accommodate superscript style.

Note that the commands `\onlinecite` and `\textcite` are not affected by this procedure.

Here's a subtle one: when is the argument of `\super@cite@@` not the same as the token `\@let@token`? Answer: when the latter is `\@sptoken`! This case has to be handled separately.

```
2030 \def\super@cite[#1][#2]#3f%
2031 \leavevmode
```

```

2032 \skip@\lastskip
2033 \unskip
2034 \begingroup
2035 \def\@tempa{[#1][#2]{#3}}%
2036 \super@cite@
2037 }%
2038 \def\super@cite@{%
2039 \futurelet\@let@token\super@cite@@
2040 }%
2041 \long\def\super@cite@@#1{%
2042 \@ifx{\@let@token\@sptoken}{%
2043 \aftergroup\@sptoken>false@sw
2044 }{%
2045 \@ifx{\@let@token.}{\true@sw}{%
2046 \@ifx{\@let@token,}{\true@sw}{%
2047 \@ifx{\@let@token'}{\true@sw}{%
2048 \@ifx{\@let@token)}{\true@sw}{%
2049 \false@sw
2050 }%
2051 }%
2052 }%
2053 }%
2054 }%
2055 {%
2056 #1%
2057 \super@cite@
2058 }{%
2059 \expandafter\@citex@NAT\@tempa\endgroup
2060 #1%
2061 }%
2062 }%
2063 \AtBeginDocument{%
2064 \citeautoscript@sw{%
2065 \@ifx{\place@bibnumber\place@bibnumber@sup}{%
2066 \let\@citex@NAT\@citex\let\@citex\super@cite
2067 }{}%
2068 }{}%
2069 }%

```

Resolve an incompatibility between `natbib` and `listings`. The latter package tests `\chapter` (which has now been `\let` to `\relax` as a side effect `natbib`'s use of L^AT_EX's `\ifundefined`).

We couch our fix in such terms that will not be disruptive if `\chapter` is actually defined at this point.

```

2070 \@ifx{\chapter\relax}{\let\chapter\@undefined}{}%

```

15.1.2 `\endnotes` and `\rtx@bibnotes`

FIXME: check hyperref compatibility!

```

\mini@note
\save@note 2071 \def\mini@note{\save@note\mini@notes}%Implicit #1
2072 \def\save@note#1#2{%
2073 \stepcounter{footnote}%
2074 \protected@xdef\@thefnmark{\the\c@footnote}%
2075 \@footnotemark
2076 \expandafter\g@addto@macro
2077 \expandafter#1%
2078 \expandafter{%
2079 \expandafter \@@footnotetext
2080 \expandafter {\@thefnmark}{#2}%
2081 }%
2082 }%
2083 \long\def\@@footnotetext#1{\def\@thefnmark{#1}\@footnotetext}%
2084 \let\mini@notes\@empty

\endnote A version of footnote that appears at the end of the document. Actually it just
appears where \printendnotes appears.
2085 \def\endnote{%
2086 \begingroup
2087 \aftergroup\@footnotemark
2088 \aftergroup\@endnotetext
2089 \@ifnextchar[{%
2090 \@xendnote
2091 }{%
2092 \stepcounter{footnote}%
2093 \protected@xdef\@tempa{\thefootnote}%
2094 \expandafter\@xendnote\expandafter[\@tempa]%
2095 }%
2096 }%

\@xendnote
2097 \def\@xendnote[#1]{%
2098 \begingroup
2099 \c@footnote#1\relax
2100 \unrestored@protected@xdef\@thefnmark{endnote\thefootnote}%
2101 \endgroup
2102 \endgroup
2103 }%
2104 \def\@endnotemark{%
2105 \expandafter\cite\expandafter{\@thefnmark}%
2106 }%

\endnote@ext
2107 \def\endnote@ext{.end}%

\@endnotetext The commands \label, \index, and \glossary, which are robustified for
\markright and \addcontentsline, are likewise robustified here.
Note the similarity to \protected@write.

```

```

2108 \long\def\@endnotetext#1{%
2109   \@ifxundefined\@endnoteout{%
2110     \newwrite\@endnoteout
2111     \gdef\endnote@stream{\jobname\endnote@ext}%
2112     \immediate\openout\@endnoteout\endnote@stream\relax
2113   }{%
2114   \begingroup
2115     \let\label\relax \let\index\relax \let\glossary\relax
2116     \let\cite \relax \let\ref \relax \let\pageref \relax
2117     \let\(\ \relax \let\)\ \relax \let\ \relax
2118   % \let\protect\noexpand
2119     \let \protect \@unexpandable@protect
2120     \newlinechar'\^M%
2121   % \newlinechar'\ %
2122     \immediate\write\@endnoteout{\string\@doendnote{\@thefnmark}{#1}}%
2123   \endgroup
2124 }%

```

\endnotetext

```

2125 \def\endnotetext{%
2126   \@ifnextchar[{%
2127     \@xendnotenext
2128   }{%
2129     \protected@xdef\@thefnmark{\thefootnote}%
2130     \@endnotetext
2131   }%
2132 }%

```

\@xendnotenext

```

2133 \def\@xendnotenext[#1]{%
2134   \begingroup
2135     \c@footnote#1\relax
2136     \unrestored@protected@xdef\@thefnmark{\thefootnote}%
2137   \endgroup
2138   \@endnotetext
2139 }%

```

\printendnotes

```

2140 \def\printendnotes{%
2141   \@ifx{\@endnoteout\@undefined}{-}{%
2142     \begingroup
2143       \c@secnumdepth-\maxdimen
2144       \section{%
2145         \notesname
2146       }%
2147       \immediate\closeout\@endnoteout
2148       \global\let\@endnoteout\@undefined
2149       \begin{enumerate}%
2150         \makeatletter

```

```

2151 \input{\endnote@stream}%
2152 \end{enumerate}%
2153 \endgroup
2154 }%
2155 }%
2156 \appdef\class@enddocumenthook{%
2157 \printendnotes
2158 }%

```

`\firstnote@num` In REVTeX, we have permanently altered the way that the footnote counter gets reset at the beginning of the document.

`\set@firstnote` If footnotes appear in the bibliography, we initialise the footnote counter to number of cites (found last time) via `\set@firstnote`.

```

2159 \mathchardef\firstnote@num\z@
2160 \appdef\class@documenthook{%
2161 \global\c@footnote\firstnote@num
2162 \appdef\maketitle{\global\c@footnote\firstnote@num}%
2163 }%
2164 \def\set@firstnote#1{%
2165 \@ifnum{\firstnote@num=#1\relax}{-}{%
2166 \class@warn@end{Endnote numbers changed: rerun LaTeX}%
2167 }%
2168 \immediate\write\@mainaux{%
2169 \global\chardef\string\firstnote@num#1\relax
2170 }%
2171 }%

```

`\@endnotesinbib` We define a function `\@endnotesinbib`, and a variant `\@endnotesinbibliography`.
`\@endnotesinbibliography` The former is invoked at the start of the end processing for `\end{thebibliography}`; the latter is a synonym.

The procedure typesets the footnotes that are to appear in the bibliography; the default is to simply arrange for the footnote counter to be reset at the start of the document.

The switchover to setting footnotes in the bibliography is done via `\AtBeginDocument` code that changes the meaning of `\footnote` and that substitutes the synonym for `\@endnotesinbib`.

Note that this code make the assumption that the counter used in `thebibliography` is `\c@NAT@ctr`.

```

2172 \def\@endnotesinbib{%
2173 \set@firstnote\z@
2174 }%
2175 \def\@endnotesinbibliography{%
2176 \expandafter\set@firstnote\expandafter{\the\c@NAT@ctr}%
2177 \@ifx{\@endnoteout\@undefined}{-}{%
2178 \immediate\closeout\@endnoteout
2179 \global\let\@endnoteout\@undefined
2180 \makeatletter
2181 \input{\endnote@stream}%

```



```

2182 }%
2183 }%
2184 \appdef\class@documenthook{%
2185 \let\@makefnmark@latex\@makefnmark
2186 \let\@footnotemark@latex\@footnotemark
2187 \footinbib@sw{%
2188 \let\footnote\endnote
2189 \let\@footnotemark\@endnotemark
2190 \let\@makefnmark\@makefnmark@cite
2191 \let\@endnotesinbib\@endnotesinbibliography
2192 \appdef\class@enddocumenthook{\auto@bib}%
2193 \let\printendnotes\relax
2194 }{}%
2195 }%

```

`\auto@bib` Under some circumstances, we must typeset the bibliography automatically. For instance, the document specifies footnotes in the bibliography, but contains no bibliography.

Note that this facility is not able to work more than once per document. If multiple bibliographys are required (e.g., per article), it will be the responsibility of the journal style to restore `\auto@bib` to its original meaning so it can be re-invoked.

```

2196 \def\auto@bib{%
2197 \@ifx@empty\@FMN@list{%
2198 \@ifxundefined\@endnoteout{%
2199 \false@sw
2200 }{%
2201 \true@sw
2202 }%
2203 }{}%
2204 \true@sw
2205 }{}%
2206 \begin{thebibliography}{} \end{thebibliography}%
2207 }%
2208 }%

```

`\@doendnote`

```

2209 \def\@doendnote#1#2{\bibitem{#1}#2}

```

16 Initial setup

Note that this code is executed at `\AtBeginDocument` time in order to handle a particular timing problem. Please do not move this code any earlier!

```

2210 \appdef\class@documenthook{%

```

We assert our own page style only if nobody else has done so. Users wishing to customize their documents will be able to invoke a `\pagestyle` command anywhere in the preamble.

```

2211 \@ifundefined\@evenhead{%
2212 \@ifundefined\@oddhead{%
2213 \@ifundefined\@oddfoot{%
2214 \@ifundefined\@evenfoot{%
2215 \preprintsty@sw{%
2216 \ps@preprint
2217 }{%
2218 \ps@article
2219 }%
2220 }{}%
2221 }{}%
2222 }{}%
2223 }{}%
2224 \pagenumbering{arabic}%
2225 \normalsize
2226 \tabbingsep \labelsep
2227 \leftmargin\leftmargini
2228 \labelwidth\leftmargin\advance\labelwidth-\labelsep
2229 \let\@listi\@listI
2230 \@listi

2231 %\twoside@sw{}{%
2232 % \raggedbottom
2233 }%

```

We make sure that the “environment” component mark is set.

```

2234 \def\curr@envir{document}%
2235 \mark@envir{\curr@envir}%

```

When setting the column grid, we have to alter the procedure for formatting lists. Because `\twocolumngrid` requires rebalancing columns at some points, lists must *not* involve the use of `\moveleft`, `\moveright`, or `\parshape`. The alternative procedure only involves the manipulation of `\leftskip` and `\rightskip`.

FIXME: Always sloppy??

```

2236 \twocolumn@sw{%
2237 \open@column@mlt\tw@
2238 \set@colht
2239 \@floatplacement
2240 \@dblfloatplacement
2241 \sloppy
2242 \@booleanfalse\raggedcolumn@sw
2243 \let\set@listindent\set@listindent@
2244 }{%
2245 \open@column@one\@ne
2246 \set@colht
2247 \@floatplacement
2248 \@dblfloatplacement
2249 \sloppy
2250 % \raggedbottom
2251 \let\set@listindent\set@listindent@parshape
2252 }%

```

2253 }%

17 \appendix

2254 %\newif\ifappendixon

Note that, within appendices, equations are numbered within sections (appendices).

2255 \def\appendix{%

2256 \par

2257 %\appendixontrue

2258 \setcounter{section}\z@

2259 \setcounter{subsection}\z@

2260 \setcounter{subsubsection}\z@

2261 \def\thesubsection{\arabic{subsection}}%

2262 \def\thesubsubsection{\alph{subsubsection}}%

2263 \@addtoreset{equation}{section}%

2264 \def\theequation@prefix{\thesection}%

2265 \addtocontents{toc}{\protect\appendix}%

2266 \@ifstar{%

2267 \def\thesection{\unskip}%

2268 \def\theequation@prefix{A.}%

2269 }{%

2270 \def\thesection{\Alph{section}}%

2271 }%

2272 }%

18 Changing the page grid

18.1 Avoiding Grid Changes

In preprint styles, “wide text” is a no-op, and the title page processing involves no grid change.

\title@column@default

\close@column@default 2273 \def\title@column@default#1{%

2274 \minipagefootnote@init

2275 #1%

2276 \minipagefootnote@foot

2277 }%

2278 \def\close@column@default{%

2279 \newpage

2280 }%

18.2 Galley Style: Margin Changes

A variant of preprint processing. Emulate journal appearance somewhat.

widetext@galley DPC: We’re in galley style so do a lob sided display environment.

QUERY: How can we be sure that we are in galley style? ANSWER: as noted elsewhere, require both `\twocolumn@sw` and `\preprintsty@sw` to be false.

```

2281 \def\galley@outdent{\rightmargin-\columnwidth\advance\rightmargin-\columnsep}%
2282 \let\widetext@outdent\@empty
2283 \newenvironment{widetext@galley}{%
2284 \list{}{%
2285 \topsep \z@skip
2286 \listparindent \parindent
2287 \itemindent \parindent
2288 \leftmargin \z@
2289 \parsep \z@\@plus\p@
2290 \widetext@outdent
2291 \relax
2292 }%
2293 \item\relax
2294 }{
2295 \endlist
2296 }%

```

18.3 Grid Changing Via ltxgrid

In case `twocolumngrid` has been invoked, switch column grid using the column grid-changing commands. Supply stub definitions of those commands here.

`\title@column@grid` The title block always starts at the top of a new page.
`\close@column@grid` Note that, for the procedure `\close@column@grid`, we balance columns by switching to the one-column page grid, then we return to a two-column page grid in anticipation of the upcoming `\clearpage`.

```

2297 \def\title@column@grid#1{%
2298 \minipagefootnote@init
2299 \onecolumngrid
2300 \begingroup
2301 \let\@footnotetext\frontmatter@footnotetext
2302 \let\set@footnotewidth\set@footnotewidth@ii
2303 #1%
2304 \endgroup
2305 \twocolumngrid
2306 \minipagefootnote@foot
2307 }%
2308 \def\close@column@grid{%
2309 \balancelastpage@sw{%
2310 \onecolumngrid
2311 % \twocolumngrid
2312 }{}}%
2313 }%

```

`widetext@grid` We slip into the one-column page grid within the scope of this environment.

Note that we set adornments above and below the `widetttext`. These are set as leaders, so they will disappear at a page break.

```

2314 \newenvironment{widetext@grid}{%
2315   \par\ignorespaces
2316   \setbox\widetext@top\vbox{%
2317     \vskip15\p@
2318     \hb@xt@\hsize{%
2319       \leaders\hrule\hfil
2320       \vrule\@height6\p@
2321     }%
2322     \vskip6\p@
2323   }%
2324   \setbox\widetext@bot\hb@xt@\hsize{%
2325     \vrule\@depth6\p@
2326     \leaders\hrule\hfil
2327   }%
2328   \onecolumngrid
2329   \dimen@ \ht\widetext@top\advance\dimen@\dp\widetext@top
2330   \cleaders\box\widetext@top\vskip\dimen@
2331   \let\set@footnotewidth\set@footnotewidth@ii
2332 }{%
2333   \par
2334   \setbox\widetext@bot\vbox{%
2335     \hb@xt@\hsize{\hfil\box\widetext@bot}%
2336     \vskip14\p@
2337   }%
2338   \dimen@ \ht\widetext@bot\advance\dimen@\dp\widetext@bot
2339   \cleaders\box\widetext@bot\vskip\dimen@
2340   \twocolumngrid\global\@ignoretrue
2341   \@endpetrue
2342 }%
2343 \newbox\widetext@top
2344 \newbox\widetext@bot

```

Decide, finally, how the page grid is to be manipulated.

```

2345 \appdef\class@documenthook{%
2346   \twocolumn@sw{%
2347     \let@environment{widetext}{widetext@grid}%
2348     \let\title@column\title@column@grid
2349     \let\close@column\close@column@grid
2350   }{%
2351     \let@environment{widetext}{widetext@galley}%
2352     \preprintsty@sw{%

```

Change the page grid not at all.

```

2353   }{%

```

If we are galley style, change the page margin only.

```

2354     \galley@sw{%
2355       \let\widetext@outdent\galley@outdent
2356     }{%
2357     }%

```

```

2358 }%
2359 }%
2360 }%

```

`\title@column` Provide a default meaning for `\title@column` in case it was never defined.

```

2361 \appdef\class@inithook{%
2362 \@ifxundefined\title@column{%
2363 \let\title@column\title@column@default
2364 }{}%
2365 }%

```

19 Old font commands

```

2366 \DeclareOldFontCommand{\rm}{\normalfont\rmfamily}{\mathrm}
2367 \DeclareOldFontCommand{\sf}{\normalfont\sffamily}{\mathsf}
2368 \DeclareOldFontCommand{\tt}{\normalfont\ttfamily}{\mathtt}
2369 \DeclareOldFontCommand{\bf}{\normalfont\bfseries}{\mathbf}
2370 \DeclareOldFontCommand{\it}{\normalfont\itshape}{\mathit}
2371 \DeclareOldFontCommand{\sl}{\normalfont\slshape}{\@nomath\sl}
2372 \DeclareOldFontCommand{\sc}{\normalfont\scshape}{\@nomath\sc}
2373 \DeclareRobustCommand*\cal{\@fontswitch\relax\mathcal}
2374 \DeclareRobustCommand*\mit{\@fontswitch\relax\mathnormal}

```

20 English-Language Texts

As this class is just for English language journals, we could hardwire these texts, but to make it easier to use this as a basis for the code for similar journal styles, separate out all the fixed text strings into babel-style macros of the form `\...name`

Note: for babel compatibility, use version 1999/05/05 v3.6x or later.

Some of these might need changing in the society-specific code.

`\today` Procedure `\today` is used in the article class, but not in this document class.

```

2375 \def\today{\ifcase\month\or
2376 January\or February\or March\or April\or May\or June\or
2377 July\or August\or September\or October\or November\or December\fi
2378 \space\number\day, \number\year}

```

`\notesname` Text entity `\notesname` is used in `\printendnotes`.

```

2379 \def\notesname{Notes}

```

`\partname` Text entity `\partname` is used in `\@part`.

```

2380 \def\partname{Part}

```

`\tocname` Text entity `\tocname` is used in `\tableofcontents`, as defined in the standard L^AT_EX book class.

```

2381 \def\tocname{Contents}

```

`\lofname` Text entity `\lofname` is used in `\listoffigures`, as defined in the standard L^AT_EX book class.
2382 `\def\lofname{List of Figures}`

`\lotname` Text entity `\lotname` is used in `\listoftables`, as defined in the standard L^AT_EX book class.
2383 `\def\lotname{List of Tables}`

`\refname` Text entity `\refname` is used in `thebibliography`.
2384 `\def\refname{References}`

`\indexname` Text entity `\indexname` is used in `theindex`, as defined in the standard L^AT_EX book class.
2385 `\def\indexname{Index}`

`\figurename` Text entity `\figurename` is used in `figure`, `\figuresname` in `\printfigures`.
2386 `\def\figurename{FIG.}`
2387 `\def\figuresname{Figures}%`

`\tablename` Text entity `\tablename` is used in `table`, `\tablesname` in `\printtables`.
2388 `\def\tablename{TABLE}`
2389 `\def\tablesname{Tables}%`

`\abstractname` Text entity `\abstractname` is used in `abstract`.
2390 `\def\abstractname{Abstract}`

`\appendixesname` Text entity `\appendixesname` is used in TOC.
`\appendixname` 2391 `\def\appendixesname{Appendixes}%`
2392 `\def\appendixname{Appendix}%`

`\acknowledgmentsname` Text entity `\acknowledgmentsname` is used in `acknowledgments`.
2393 `\def\acknowledgmentsname{Acknowledgments}`

`\journalname` This should be set by the society journal options, eg ‘pra’.
2394 `\def\journalname{??}`

`\copyrightname` Default layout does not assign copyright, but a journal that wants to might use this.
2395 `\def\copyrightname{??}`

`\andname` The text string “and” for use in author lists.
2396 `\def\andname{and}`

`\@pacs@name` The text string prepended to PACS numbers, resp. to keywords.
`\@keys@name` 2397 `\def\@pacs@name{PACS numbers: }%`
2398 `\def\@keys@name{Keywords: }%`

`\ppname` The text string “pp” for use in page ranges.
2399 `\def\ppname{pp}`

`\numbername` The text string “number” for use in article reference.
2400 `\def\numbername{number}`

`\volumename` The text string “volume” for use in article reference.
2401 `\def\volumename{volume}`

`\Dated@name` These texts are used in the `\date`, et al. commands.
`\Received@name` 2402 `\def\Dated@name{Dated: }%`
`\Revised@name` 2403 `\def\Received@name{Received }%`
`\Accepted@name` 2404 `\def\Revised@name{Revised }%`
`\Published@name` 2405 `\def\Accepted@name{Accepted }%`
2406 `\def\Published@name{Published }%`

21 Legacy Commands

We define some commands left over from version 3.1, or give default meanings. Some definitions can be overridden in the document preamble or in included packages.

Note on the namespace: command names like `\REV@name` are used here, because it is not clear that any of this code is generally useful.

```
2407 \def\address{\replace@command\address\affiliation}%
2408 \def\altaddress{\replace@command\altaddress\altaffiliation}%
2409 \newenvironment{references}{%
2410 \class@warn@end{The references environment is not supported; use thebibliography instead.}
2411 \gdef\references{\thebibliography{}}\references
2412 }{%
2413 \endthebibliography
2414 }%
2415 \def\draft{%
2416 \class@warn@end{Command \string\draft\space is obsolete;^^JInvoke option draft instead.}%
2417 \@booleantrue\draft@sw
2418 }%
2419 \def\tighten{%
2420 \class@warn@end{Command \string\tighten\space is obsolete;^^JInvoke option tightenlines instead.}
2421 \@booleantrue\tightenlines@sw
2422 }%
2423 \def\tableline{%
2424 \noalign{%
2425 \class@warn@end{Command \string\tableline\space is obsolete;^^JUse \string\colrule\space instead.}
2426 \global\let\tableline\colrule
2427 }%
2428 \tableline
2429 }%
2430 \def\case{\replace@command\case\frac}%
```



```

2431 \def\slantfrac{\replace@command\slantfrac\frac}%
2432 \def\tablenote{\replace@command\tablenote\footnote}%
2433 \def\tablenotemark{\replace@command\tablenotemark\footnotemark}%
2434 \def\tablenotetext{\replace@command\tablenotetext\footnotetext}%
2435 % Lose the following definition:
2436 \DeclareRobustCommand\REV@text[1]{%
2437 \relax
2438 \ifmmode
2439 \mathchoice
2440 {\hbox{\everymath{\displaystyle #1}}}%
2441 {\hbox{\everymath{\textstyle #1}}}%
2442 {\hbox{\everymath{\scriptstyle #1}\let\f@size\sf@size\selectfont#1}}%
2443 {\hbox{\everymath{\scriptscriptstyle #1}\let\f@size\ssf@size\selectfont#1}}%
2444 \glb@settings
2445 \else
2446 \mbox{#1}%
2447 \fi
2448 }%
2449 % Lose the following definition:
2450 \DeclareRobustCommand\REV@bbox[1]{%
2451 \relax
2452 \ifmmode
2453 \mathchoice
2454 {\hbox{\everymath{\displaystyle #1}\boldmath$#1$}}%
2455 {\hbox{\everymath{\textstyle #1}\boldmath$#1$}}%
2456 {\hbox{\everymath{\scriptstyle #1}\boldmath$#1$}}%
2457 {\hbox{\everymath{\scriptscriptstyle #1}\boldmath$#1$}}%
2458 \glb@settings
2459 \else
2460 \mbox{#1}%
2461 \fi
2462 }%
2463 \DeclareRobustCommand\REV@bm[1]{%
2464 \class@warn@end{To use \string\bm, please load the bm package!}%
2465 \global\let\bm\relax
2466 }%
2467 \def\FL{\obsolete@command\FL}%
2468 \def\FR{\obsolete@command\FR}%
2469 \def\narrowtext{\obsolete@command\narrowtext}%
2470 \def\mediumtext{\obsolete@command\mediumtext}%
2471 \newenvironment{quasitable}{%
2472 \let@environment{tabular}{longtable}%
2473 }{%
2474 }%

\text If not otherwise defined, give default meanings to certain commands.
\bm 2475 \appdef\class@inithook{%
\bbinfo 2476 \@ifxundefined\text{\let\text\REV@text}{%
\eprint 2477 \@ifxundefined\bm{\let\bm\REV@bm}{%
\url 2478 \providecommand\bbinfo[2]{#2}%

```

```

2479 \providecommand\epprint[2][\]{#2}%
2480 \providecommand\url[1]{#1}%
2481 }%

```

`\bbox`

```

2482 \def\bbox#1{%
2483 \class@warn@end{\string\bbox\space is obsolete,^^Jload the bm package and use \string\bm\space
2484 \global\let\bbox\relax
2485 }%

```

`\mathletters`

```

2486 \newenvironment{mathletters}{%
2487 \class@warn@end{Environment {mathletters} is obsolete;^^Jload the amsmath package and use {sub
2488 \global\let\mathletters@empty
2489 }{%
2490 }%

```

`\eqnum`

```

2491 \def\eqnum#1{%
2492 \class@warn@end{\string\eqnum\space is obsolete, load the amsmath package and use \string\tag!
2493 \global\let\eqnum@gobble
2494 }%

```

We read in the symbol definitions.

```

2495 \RequirePackage{revsymb}%
2496 \appdef\class@inithook{\revsymb@inithook}%

```

22 Endgame for the Document Class

This section contains definitions related to the end-of-class processing: we want to control exactly what happens next.

We provide for a “job macro package” that can override definitions made by the class or any other packages it loads. We act on the value of `\secnumarabic@sw`; this code is a model for dealing with the job macro package. We also install a the very last procedures into `\AtEndOfClass`, ones that need to tail on to any processing performed either by the class, by any of its included packages, or by the job macro package and any packages it may have loaded.

22.1 Job Macro Package

You can create a “job macro package” for your document that will be read in automatically every time your document is processed. Thus, if your job is a file called `myarticle.tex`, then the file `myarticle.rty` will be read in just the same as if you had placed a `\usepackage{myarticle.rty}` statement immediately following your `\documentclass` statement.

Within your `.rty` file, you can define and use control sequence names that use the `@` character and you can override any of the definitions or assignments made

by the REVTeX document class or the selected journal substyle. That is, you have the power to really mess things up badly.

If you choose to have a job macro package, you are well advised to read the L^AT_EX guide to document classes, revtex4.dtxclsguide.tex or read up on the subject in a book like the L^AT_EX Companion.

The file revtex4.dtxtemplate.rty contains a template for creating your own job macro package.

```
2497 \AtEndOfClass{%
2498 \InputIfFileExists{\jobname.rty}{-}{-}%
2499 }%
```

22.2 \secnumarabic@sw

`\secnumarabic@sw` The flag `\secnumarabic@sw` signifies that sectioning commands are to be numbered arabic. The effect of this command should override any settings made by the journal substyle or by the job macro package. However, it should be lower in precedence to definitions appearing in the document preamble. Therefore, we install its code into `\AtEndOfClass`, but do it *after* the corresponding code for the journal substyle and the job macro package.

Note: `\thesection` must *not* be redefined, say, at `\AtBeginDocument` time by some delayed code.

```
2500 \AtEndOfClass{%
2501 \@ifxundefined\secnumarabic@sw{\@booleanfalse\secnumarabic@sw}{-}%
2502 \secnumarabic@sw{%
2503 \def\p@section          {}%
2504 \def\thesection        {\arabic{section}}%
2505 \def\p@subsection      {}%
2506 \def\thesubsection     {\thesection.\arabic{subsection}}%
2507 \def\p@subsubsection   {}%
2508 \def\thesubsubsection  {\thesubsection.\arabic{subsubsection}}%
2509 }-}%
2510 }%
```

22.3 Hook for default values of Booleans

This portion of the code for this class file *must* appear at the very end.

`\defaults@hook` The procedure `\defaults@hook` should hereby be the very last to be installed into `\AtBeginDocument`. We provide it with a default in case it has not been used up til now.

CHECKME: is any other hook installed later than `\defaults@hook`?

```
2511 \AtEndOfClass{%
2512 \appdef\class@documenthook{%
2513 \defaults@hook
2514 }%
2515 }%
2516 \@ifxundefined\defaults@hook{\let\defaults@hook\@empty}{-}%
```

End of the class file.

```
2517 %</class-pst>
```

23 Symbols: the revsymb module

We immediately define a utility command: this module's warning.

```
2518 %<*revsymb>
```

```
2519 \def\REVSymb@warn#1{\PackageWarningNoLine{revsymb}{#1}}%
```

`\lambdabar`

```
2520 \DeclareRobustCommand\lambdabar{%
2521   \bgroup
2522   \def\@tempa{%
2523     \hbox{%
2524       \raise.73\ht\z@
2525       \hb@xt@\z@{%
2526         \kern.25\wd\z@
2527         \vrule \@width.5\wd\z@\@height.1\p@\@depth.1\p@
2528         \hss
2529       }%
2530     \box\z@
2531   }%
2532 }%
2533 \mathchoice
2534   {\setbox\z@\hbox{\$ \displaystyle \lambda\$}\@tempa}%
2535   {\setbox\z@\hbox{\$ \textstyle \lambda\$}\@tempa}%
2536   {\setbox\z@\hbox{\$ \scriptstyle \lambda\$}\@tempa}%
2537   {\setbox\z@\hbox{\$ \scriptscriptstyle \lambda\$}\@tempa}%
2538 \egroup
2539 }%
```

`\openone` DPC: Really should use a font that includes this glyph. Unfortunately not in AMS ones, but is in `bbold`, `cmbb`. (I think, must check), FIXME: check for `bbold`.

```
2540 \DeclareRobustCommand\openone{\leavevmode\hbox{\small1\normalsize\kern-.33em1}}%
```

`\corresponds` Jörg Knappen suggests the replacements: replace `\corresponds` with `\triangleq`, `\overdots` source `amssymb`; replace `\overcirc` with `\mathring`, source `latex2e`; replace `\overcirc` `\overdots` with `\ddot`, source `amsmath`.

Any use of any of these commands will result in a warning message at the end of the log file. If the corresponding package is not loaded, a definition will quietly be provided.

```
2541 \DeclareRobustCommand\corresponds{\replace@command\corresponds\triangleq}%
2542 \DeclareRobustCommand\overcirc{\replace@command\overcirc\mathring}%
2543 \DeclareRobustCommand\overdots{\replace@command\overdots\ddot}%
2544 \DeclareRobustCommand\REV@triangleq{%
2545   {\lower.2ex\hbox{=}}{\kern-.75em^{\triangle}}%
2546 }%
```

```

2547 \DeclareRobustCommand\REV@dddot[1]{%
2548 \@ontopof{#1}{\cdots}{1.0}\mathord{\box2}%
2549 }%

\succsim These version 3.1 commands are always supplied, but the definitions in amssymb
\precsim are preferred.
\lessim 2550 \DeclareRobustCommand\altsuccsim{\succ\kern-.9em_\sim\kern.3em}%
\gtrsim 2551 \DeclareRobustCommand\altprecsim{\prec\kern-1em_\sim\kern.3em}%
\alt 2552 \let\REV@succsim\altsuccsim
\agt 2553 \let\REV@precsim\altprecsim
2554 \DeclareRobustCommand\REV@lessim{\mathrel{\mathpalette\vereq{<}}}%
2555 \DeclareRobustCommand\REV@gtrsim{\mathrel{\mathpalette\vereq{>}}}%
2556 \DeclareRobustCommand\alt{\lessim}
2557 \DeclareRobustCommand\agt{\gtrsim}
2558 \def\vereq#1#2{%
2559 \lower3\p@\vbox{%
2560 \baselineskip1.5\p@
2561 \lineskip1.5\p@
2562 \ialign{${\m@th#1\hfill##\hfil$\crcr#2\crcr\sim\crcr}%
2563 }%
2564 }%

\tensor
\overstar 2565 \DeclareRobustCommand\tensor[1]{\@ontopof{#1}{\leftrightarrow}{1.15}\mathord{\box2}}
\loarrow 2566 \DeclareRobustCommand\overstar[1]{\@ontopof{#1}{\ast}{1.15}\mathord{\box2}}
\roarrow 2567 \DeclareRobustCommand\loarrow[1]{\@ontopof{#1}{\leftarrow}{1.15}\mathord{\box2}}
2568 \DeclareRobustCommand\roarrow[1]{\@ontopof{#1}{\rightarrow}{1.15}\mathord{\box2}}

\@ontopof
2569 \def\@ontopof#1#2#3{%
2570 {%
2571 \mathchoice
2572 {\@ontopof{#1}{#2}{#3}\displaystyle \scriptstyle }%
2573 {\@ontopof{#1}{#2}{#3}\textstyle \scriptstyle }%
2574 {\@ontopof{#1}{#2}{#3}\scriptstyle \scriptscriptstyle}%
2575 {\@ontopof{#1}{#2}{#3}\scriptscriptstyle\scriptscriptstyle}%
2576 }%
2577 }%

\@@ontopof Same as REVTEX3, more or less.
2578 \def\@@ontopof#1#2#3#4#5{%
2579 \setbox\z@\hbox{${#4#1$}}%
2580 \setbox\fo@ur\hbox{${#5#2$}}%
2581 \setbox\to@w\ht\to@w\ht\z@ \dp\to@w\dp\z@
2582 \@ifdim{\wd\z@>\wd\fo@ur}{%
2583 \setbox\fo@ur\hb@xt@{\wd\z@}{\hss\box\fo@ur\hss}%
2584 \mathord{\rlap{\raise#3\ht\z@\box\fo@ur}\box\z@}%
2585 }{%
2586 \setbox\fo@ur\hb@xt@.9\wd\fo@ur{\hss\box\fo@ur\hss}%

```

```

2587     \setbox\z@\hb@xt@\wd\fur{\hss$#4\relax#1$\hss}%
2588     \mathord{\rlap{\copy\z@}\raise#3\ht\z@\box\fur}%
2589   }%
2590 }%

```

`\frac` Deal with legacy `\frac`: if `amsfonts` not loaded, defined in such a way as to ask for that package. Also, says to use `\mathfrac` instead.

```

2591 \DeclareRobustCommand\frac{%
2592   \REVSymb@warn{%
2593     Command \string\frac\space unsupported:^^J%
2594     please use \string\mathfrac\space instead.%
2595   }%
2596   \global\let\frac\mathfrac
2597   \frac
2598 }%
2599 \DeclareRobustCommand\REV@mathfrac{%
2600   \REVSymb@warn{%
2601     Command \string\mathfrac\space undefined:^^J%
2602     please specify the amsfonts or amssymb option!%
2603   }%
2604   \global\let\mathfrac\@firstofone
2605   \mathfrac
2606 }%

```

`\Bbb` Deal with legacy `\Bbb`: if `amsfonts` not loaded, defined in such a way as to ask for that package. Also, says to use `\mathbb` instead.

```

2607 \DeclareRobustCommand\Bbb{%
2608   \REVSymb@warn{%
2609     Command \string\Bbb\space unsupported:^^J%
2610     please use \string\mathbb\space instead.%
2611   }%
2612   \global\let\Bbb\mathbb
2613   \Bbb
2614 }%
2615 \DeclareRobustCommand\REV@mathfrac{%
2616   \REVSymb@warn{%
2617     Command \string\mathbb\space undefined:^^J%
2618     please specify the amsfonts or amssymb option!%
2619   }%
2620   \global\let\mathbb\@firstofone
2621   \mathbb
2622 }%

```

`\Biglb` Deal with legacy bold delimiters. Each of the following takes an implicit argument consisting of the delimiter to be made big and bold. **FIXME:** `\DeclareBoldMathCommand` is not the right tool!

```

2623 \def\Biglb{\REV@boldopen \Big}%
2624 \def\Bigl {\REV@boldopen \Big }%
2625 \def\biglb{\REV@boldopen \big}%

```

```

2626 \def\biglb {\REV@boldopen \big }%
2627 \def\Biggrb{\REV@boldclose\Bigg}%
2628 \def\Bigrb {\REV@boldclose\Big }%
2629 \def\biggrb{\REV@boldclose\bigg}%
2630 \def\bigrb {\REV@boldclose\big }%
2631 \def\REV@pmb#1{%
2632 \hbox{%
2633 \setbox\z@=\hbox{#1}%
2634 \kern-.02em\copy\z@\kern-\wd\z@
2635 \kern .04em\copy\z@\kern-\wd\z@
2636 \kern-.02em
2637 \raise.04em\copy\z@
2638 }%
2639 }%
2640 \def\REV@boldopen #1#2{\mathopen {\REV@pmb{#1#2}}}%
2641 \def\REV@boldclose#1#2{\mathclose{\REV@pmb{#1#2}}}%

```

\AtBeginDocument Package dependencies are taken care of \AtBeginDocument time.

```

2642 \def\revsymb@inithook{%
2643 \@ifundefined\dddot{\let\dddot\REV@dddot}{}%
2644 \@ifundefined\triangleq{\let\triangleq\REV@triangleq}{}%
2645 \@ifundefined\succsim{\let\succsim\altsuccsim}{}%
2646 \@ifundefined\precsim{\let\precsim\altprecsim}{}%
2647 \@ifundefined\lessim{\let\lessim\REV@lessim}{}%
2648 \@ifundefined\gtrsim {\let\gtrsim \REV@gtrsim }{%
2649 \@ifundefined\mathfrak{\let\mathfrak\REV@mathfrak}{}%
2650 \@ifundefined\mathbb{\let\mathbb\REV@mathbb}{}%
2651 }%
2652 %</revsymb>

```

24 The 10pt class option: the 10pt module

The file 10pt.rtx is read in by the revtex4 document class if \@pointsize has the value 10.

```

2653 %<*10pt>
2654 \def\normalsize{%
2655 \setfontsize\normalsize\@xpt{11.5}%
2656 \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
2657 \belowdisplayskip \abovedisplayskip
2658 \abovedisplayshortskip \abovedisplayskip
2659 \belowdisplayshortskip \abovedisplayskip
2660 \let\@listi\@listI
2661 }%
2662 \def\small{%
2663 \setfontsize\small\@ixpt{10.5}%
2664 \abovedisplayskip 8.5\p@ \@plus3\p@ \@minus4\p@
2665 \belowdisplayskip \abovedisplayskip

```

```

2666 \abovedisplayshortskip \z@ \@plus2\p@
2667 \belowdisplayshortskip 4\p@ \@plus2\p@ \@minus2\p@
2668 \def\@listi{%
2669   \leftmargin\leftmargini
2670   \topsep 4\p@ \@plus2\p@ \@minus2\p@
2671   \parsep 2\p@ \@plus\p@ \@minus\p@
2672   \itemsep \parsep
2673 }%
2674 }%

2675 \def\footnotesize{%
2676   \@setfontsize\footnotesize\@viipt{9.5pt}%
2677   \abovedisplayskip 6\p@ \@plus2\p@ \@minus4\p@
2678   \belowdisplayskip \abovedisplayskip
2679   \abovedisplayshortskip \z@ \@plus\p@
2680   \belowdisplayshortskip 3\p@ \@plus\p@ \@minus2\p@
2681   \def\@listi{%
2682     \leftmargin\leftmargini
2683     \topsep 3\p@ \@plus\p@ \@minus\p@
2684     \parsep 2\p@ \@plus\p@ \@minus\p@
2685     \itemsep \parsep
2686   }%
2687 }%

2688 \def\scriptsize{%
2689   \@setfontsize\scriptsize\@viipt\@viipt
2690 }%
2691 \def\tiny{%
2692   \@setfontsize\tiny\@vpt\@vpt
2693 }%
2694 \def\large{%
2695   \@setfontsize\large\@xiipt{14pt}%
2696 }%
2697 \def\Large{%
2698   \@setfontsize\Large\@xivpt{18pt}%
2699 }%
2700 \def\LARGE{%
2701   \@setfontsize\LARGE\@xviipt{22pt}%
2702 }%
2703 \def\huge{%
2704   \@setfontsize\huge\@xxpt{25pt}%
2705 }%
2706 \def\Huge{%
2707   \@setfontsize\Huge\@xxvpt{30pt}%
2708 }%

2709 %\appdef\class@documenthook{%
2710   \@ifundefined\twoside@sw{\@booleanfalse\twoside@sw}{}%
2711   \twoside@sw{%
2712     % \oddsidemargin -.1in
2713     % \evensidemargin -.4in
2714     \oddsidemargin -20pt

```



```

2715 \evensidemargin -20pt
2716 \marginparwidth 107pt
2717 }{%
2718 \oddsidemargin -.25in
2719 \evensidemargin -.25in
2720 \marginparwidth 30pt
2721 }%
2722 %}%

2723 \marginparsep 6pt

2724 \topmargin -61pt

2725 \headheight 25pt
2726 \headsep 16pt

2727 \topskip 10pt

2728 \footskip 30pt

      Was: 57\baselineskip+ \topskip
2729 %\appdef\set@pica@hook{%
2730 \textheight = 56pc
2731 %}%

2732 \textwidth42.5pc

2733 \columnsep 1.5pc
2734 \columnseprule 0pt

2735 \footnotesep 1pt
2736 \skip\footins 39pt plus 4pt minus 2pt
2737 \def\footnoterule{\kern-19pt\hrule width.5in\kern18.6pt\relax}%

2738 \floatsep 12pt plus 2pt minus 2pt
2739 \textfloatsep 20pt plus 2pt minus 4pt
2740 \intextsep 12pt plus 2pt minus 2pt

2741 \dblfloatsep 12pt plus 2pt minus 2pt
2742 \dbltextfloatsep 20pt plus 2pt minus 4pt

2743 \@fptop 0pt plus 1fil
2744 \@fpsep 8pt plus 2fil
2745 \@fpbot 0pt plus 1fil
2746 \@dblftop 0pt plus 1fil
2747 \@dblfpsep 8pt plus 2fil
2748 \@dblfpbot 0pt plus 1fil

2749 \marginparpush 5pt

2750 \parskip 0pt plus 1pt
2751 \parindent 10pt
2752 \emergencystretch8\p@

2753 \partopsep 2pt plus 1pt minus 1pt

2754 \leftmargini 25pt
2755 \leftmarginii 22pt

```

```

2756 \leftmarginiii 18.7pt
2757 \leftmarginiv 17pt
2758 \leftmarginv 10pt
2759 \leftmarginvi 10pt

2760 \def\@listI{%
2761 \leftmargin\leftmargini
2762 \parsep 4\p@ plus2\p@ minus\p@
2763 \topsep 8\p@ plus2\p@ minus4\p@
2764 \itemsep 4\p@ plus2\p@ minus\p@
2765 }%

2766 \labelsep 4pt

2767 \def\@listii{%
2768 \leftmargin\leftmarginii
2769 \labelwidth\leftmarginii
2770 \advance\labelwidth-\labelsep
2771 \topsep 4\p@ plus2\p@ minus\p@
2772 \parsep 2\p@ plus\p@ minus\p@
2773 \itemsep \parsep
2774 }%

2775 \def\@listiii{%
2776 \leftmargin\leftmarginiii
2777 \labelwidth\leftmarginiii
2778 \advance\labelwidth-\labelsep
2779 \topsep 2\p@ plus\p@ minus\p@
2780 \parsep \z@
2781 \partopsep \p@ plus\z@ minus\p@
2782 \itemsep \topsep
2783 }%

2784 \def\@listiv{%
2785 \leftmargin\leftmarginiv
2786 \labelwidth\leftmarginiv
2787 \advance\labelwidth-\labelsep
2788 }%

2789 \def\@listv{%
2790 \leftmargin\leftmarginv
2791 \labelwidth\leftmarginv
2792 \advance\labelwidth-\labelsep
2793 }%

2794 \def\@listvi{%
2795 \leftmargin\leftmarginvi
2796 \labelwidth\leftmarginvi
2797 \advance\labelwidth-\labelsep
2798 }%

2799 %</10pt>

```

25 The 11pt class option: the 11pt module

The file 11pt.rtx is read in by the revtex4 document class if `\@pointsize` has the value 11.

```
2800 %<*11pt>
2801 \def\normalsize{%
2802   \@setfontsize\normalsize\@xipt{13.6}%
2803   \abovedisplayskip 11\p@ \@plus3\p@ \@minus6\p@
2804   \belowdisplayskip \abovedisplayskip
2805   \abovedisplayshortskip \abovedisplayskip
2806   \belowdisplayshortskip \abovedisplayskip
2807   \let\@listi\@listI
2808 }%
2809 \def\small{%
2810   \@setfontsize\small\@xpt\@xiipt
2811   \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
2812   \abovedisplayshortskip \z@ \@plus3\p@
2813   \belowdisplayshortskip 6\p@ \@plus3\p@ \@minus3\p@
2814   \def\@listi{\leftmargin\leftmarginI
2815             \topsep 6\p@ \@plus2\p@ \@minus2\p@
2816             \parsep 3\p@ \@plus2\p@ \@minus\p@
2817             \itemsep \parsep
2818   }%
2819   \belowdisplayskip \abovedisplayskip
2820 }%
2821 \def\footnotesize{%
2822   \@setfontsize\footnotesize\@ixpt{11}%
2823   \abovedisplayskip 8\p@ \@plus2\p@ \@minus4\p@
2824   \abovedisplayshortskip \z@ \@plus\p@
2825   \belowdisplayshortskip 4\p@ \@plus2\p@ \@minus2\p@
2826   \def\@listi{\leftmargin\leftmarginI
2827             \topsep 4\p@ \@plus2\p@ \@minus2\p@
2828             \parsep 2\p@ \@plus\p@ \@minus\p@
2829             \itemsep \parsep
2830   }%
2831   \belowdisplayskip \abovedisplayskip
2832 }%
2833 \def\scriptsize{%
2834   \@setfontsize\scriptsize\@viiipt{9.5}%
2835 }%
2836 \def\tiny{%
2837   \@setfontsize\tiny\@vipt\@viipt
2838 }%
2839 \def\large{%
2840   \@setfontsize\large\@xiipt{14}%
2841 }%
2842 \def\Large{%
2843   \@setfontsize\Large\@xivpt{18}%
```

```

2844 }%
2845 \def\LARGE{%
2846   \@setfontsize\LARGE\@xviipt{22}%
2847 }%
2848 \def\huge{%
2849   \@setfontsize\huge\@xxpt{25pt}%
2850 }%
2851 \def\Huge{%
2852   \@setfontsize\Huge\@xxvpt{30pt}%
2853 }%
2854 %</11pt>

```

26 The 12pt class option: the 12pt module

The file 12pt.rtx is read in by the revtex4 document class if \@pointsizes has the value 12.

```

2855 %<*12pt>
2856 \def\normalsize{%
2857   \@setfontsize\normalsize\@xiipt{14pt}%
2858   \abovedisplayskip 12\p@ \@plus3\p@ \@minus7\p@
2859   \belowdisplayskip \abovedisplayskip
2860   \abovedisplayshortskip \z@ plus3\p@
2861   \belowdisplayshortskip 6.5\p@ \@plus3.5\p@ \@minus3\p@
2862   \let\@listi\@listI
2863 }%
2864 \def\small{%
2865   \@setfontsize\small\@xipt{14.5pt}%
2866   \abovedisplayskip 8\p@ \@plus3\p@ \@minus6\p@
2867   \belowdisplayskip \abovedisplayskip
2868   \abovedisplayshortskip \z@ \@plus3\p@
2869   \belowdisplayshortskip 6.5\p@ \@plus3.5\p@ \@minus3\p@
2870   \def\@listi{%
2871     \leftmargin\leftmarginI
2872     \topsep 9\p@ \@plus3\p@ \@minus5\p@
2873     \parsep 4.5\p@ \@plus2\p@ \@minus\p@
2874     \itemsep \parsep
2875   }%
2876 }%

```

Same baselineskip as \small ?

```

2877 \def\footnotesize{%
2878   \@setfontsize\footnotesize\@xpt{14.5pt}%
2879   \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
2880   \belowdisplayskip \abovedisplayskip
2881   \abovedisplayshortskip \z@ \@plus3\p@
2882   \belowdisplayshortskip 6\p@ \@plus3\p@ \@minus3\p@
2883   \def\@listi{%

```

```

2884 \leftmargin\leftmargini
2885 \topsep 6\p@ \@plus2\p@ \@minus2\p@
2886 \parsep 3\p@ \@plus2\p@ \@minus\p@
2887 \itemsep \parsep
2888 }%
2889 }%

2890 \def\scriptsize{%
2891 \setfontsize\scriptsize\@viiipt{9.5pt}%
2892 }%
2893 \def\tiny{%
2894 \setfontsize\tiny\@vipt{7pt}%
2895 }%
2896 \def\large{%
2897 \setfontsize\large\@xivpt{18pt}%
2898 }%
2899 \def\Large{%
2900 \setfontsize\Large\@xxvipt{22pt}%
2901 }%
2902 \def\LARGE{%
2903 \setfontsize\LARGE\@xxpt{25pt}%
2904 }%
2905 \def\huge{%
2906 \setfontsize\huge\@xxvpt{30pt}%
2907 }%
2908 \let\Huge=\huge
2909 %</12pt>

```

27 Page parameters

This code is common to both 11pt and 12pt.

```

2910 %<*11pt|12pt>
2911 %\appdef\class@documenthook{%
2912 \@ifundefined\twoside@sw{\@booleanfalse\twoside@sw}{}%
2913 \twoside@sw{%
2914 \oddsidemargin 0pt
2915 \evensidemargin 0pt
2916 \marginparwidth 60pt
2917 }{%
2918 \oddsidemargin 0pt
2919 \evensidemargin 0pt
2920 \marginparwidth 44pt
2921 }%
2922 }%

2923 \marginparsep 10pt
2924 \topmargin -37pt

```

```

2925 \headheight 12pt
2926 \headsep 25pt
2927 \topskip 10pt
2928 \footskip 30pt
2929 %\appdef\set@pica@hook{%
2930 \@ifxundefined\tightenlines@sw{\@booleanfalse\tightenlines@sw}{}%
2931 \textheight=665.5\p@
2932 \tightenlines@sw{%
2933 \def\baselinestretch{1}%
2934 }{%
2935 \def\baselinestretch{1.5}%
2936 }%
2937 }%

2938 \textwidth 468pt
2939 \columnsep 10pt
2940 \columnseprule 0pt

2941 \footnotesep 1pt
2942 \skip\footins 25.25pt plus 4pt minus 2pt
2943 \def\footnoterule{\kern-5.25pt\hrule width.5in\kern4.85pt\relax}

2944 \floatsep 14pt plus 2pt minus 4pt
2945 \textfloatsep 20pt plus 2pt minus 4pt
2946 \intextsep 14pt plus 4pt minus 4pt

2947 \dblfloatsep 14pt plus 2pt minus 4pt
2948 \dbltextfloatsep 20pt plus 2pt minus 4pt

2949 \@fptop 0pt plus 1fil
2950 \@fpsep 10pt plus 2fil
2951 \@fpbot 0pt plus 1fil
2952 \@dblftop 0pt plus 1fil
2953 \@dblfpsep 10pt plus 2fil%
2954 \@dblfpbot 0pt plus 1fil

2955 \marginparpush 7pt

2956 \parskip 0pt plus 1pt
2957 \parindent 15pt
2958 \emergencystretch8\p@
2959 \partopsep 3pt plus 2pt minus 2pt

2960 \leftmargini 30pt
2961 \leftmarginii 26pt
2962 \leftmarginiii 22pt
2963 \leftmarginiv 20pt
2964 \leftmarginv 12pt
2965 \leftmarginvi 12pt

2966 \def\@listI{\leftmargin\leftmargini \parsep 5\p@ plus2.5\p@ minus\p@
2967 \topsep 10\p@ plus4\p@ minus6\p@
2968 \itemsep 5\p@ plus2.5\p@ minus\p@
2969 }%

```

```

2970 \labelsep 6pt
2971 \def\@listii{\leftmargin\leftmarginii
2972 \labelwidth\leftmarginii\advance\labelwidth-\labelsep
2973 \topsep 5\p@ plus2.5\p@ minus\p@
2974 \parsep 2.5\p@ plus\p@ minus\p@
2975 \itemsep \parsep
2976 }%
2977 \def\@listiii{\leftmargin\leftmarginiii
2978 \labelwidth\leftmarginiii\advance\labelwidth-\labelsep
2979 \topsep 2.5\p@ plus\p@ minus\p@
2980 \parsep \z@ \partopsep \p@ plus\z@ minus\p@
2981 \itemsep \topsep
2982 }%
2983 \def\@listiv{\leftmargin\leftmarginiv
2984 \labelwidth\leftmarginiv\advance\labelwidth-\labelsep
2985 }%
2986 \def\@listv{\leftmargin\leftmarginv
2987 \labelwidth\leftmarginv\advance\labelwidth-\labelsep
2988 }%
2989 \def\@listvi{\leftmargin\leftmarginvi
2990 \labelwidth\leftmarginvi\advance\labelwidth-\labelsep
2991 }%
2992 %</11pt|12pt>

```

28 The aps class option: the aps module

The file `aps.rtx` is read in by the `revtex4` document class if `\@society` has the value `aps`.

Here, code specific to APS journals is separated out from the `REVTEX` document class. (Other societies can customize `REVTEX` by supplying their own `.rtx` file.)

We first give some text entities (amounting to journal abbreviations), then some APS-specific initialisations, then code for particular APS journals. In the latter case, the choice is keyed off the macro `\@journal`.

Note on `\AtEndOfClass`: this file, like all journal substyles, is read in at `\AtEndOfClass` time, so you should not use this command in this file. Mote for `LATEX` developers: It would be an improvement in `LATEX` to `\let\AtEndOfClass` to something like `\@firstofone`. This change would be effected in `\@onefilewithoptions`.

```
2993 %<*aps>
```

28.1 Defend Against Forseeable Errors

Protect this file from being read in by anything but `REVTEX`.

```
2994 \ifx\undefined\substyle@ext
```

```

2995 \def\@tempa{%
2996 \endinput
2997 \GenericWarning{I must be read in by REVTeX! (Bailing out)}%
2998 }%
2999 \expandafter\else
3000 \def\@tempa{}%
3001 \expandafter\fi\@tempa

```

28.2 Abbreviations

The following macros constitute typing shortcuts for certain journal names.

```

3002 \def\ao{Appl.\ Opt.\ }
3003 \def\ap{Appl.\ Phys.\ }
3004 \def\apl{Appl.\ Phys.\ Lett.\ }
3005 \def\apj{Astrophys.\ J.\ }
3006 \def\bell{Bell Syst.\ Tech.\ J.\ }
3007 \def\jqe{IEEE J.\ Quantum Electron.\ }
3008 \def\assp{IEEE Trans.\ Acoust.\ Speech Signal Process.\ }
3009 \def\aprop{IEEE Trans.\ Antennas Propag.\ }
3010 \def\mtt{IEEE Trans.\ Microwave Theory Tech.\ }
3011 \def\iovs{Invest.\ Ophthalmol.\ Vis.\ Sci.\ }
3012 \def\jcp{J.\ Chem.\ Phys.\ }
3013 \def\jmo{J.\ Mod.\ Opt.\ }
3014 \def\josa{J.\ Opt.\ Soc.\ Am.\ }
3015 \def\josaa{J.\ Opt.\ Soc.\ Am.\ A }
3016 \def\josab{J.\ Opt.\ Soc.\ Am.\ B }
3017 \def\jpp{J.\ Phys.\ (Paris) }
3018 \def\nat{Nature (London) }
3019 \def\oc{Opt.\ Commun.\ }
3020 \def\ol{Opt.\ Lett.\ }
3021 \def\pl{Phys.\ Lett.\ }
3022 \def\pra{Phys.\ Rev.\ A }
3023 \def\prb{Phys.\ Rev.\ B }
3024 \def\prc{Phys.\ Rev.\ C }
3025 \def\prd{Phys.\ Rev.\ D }
3026 \def\pre{Phys.\ Rev.\ E }
3027 \def\prl{Phys.\ Rev.\ Lett.\ }
3028 \def\rmp{Rev.\ Mod.\ Phys.\ }
3029 \def\pspie{Proc.\ Soc.\ Photo-Opt.\ Instrum.\ Eng.\ }
3030 \def\sjqe{Sov.\ J.\ Quantum Electron.\ }
3031 \def\vr{Vision Res.\ }

```

28.3 APS Setup

Here we define the default procedures for APS journals. Individual APS journals may override these definitions.

28.3.1 Title block

The specifics of the title block. Apply to all APS journals; individual journals may override these settings.

```
\@fnsymbol The LATEX kernel definition of \@fnsymbol is overridden.
3032 \def\@fnsymbol#1{%
3033 \ensuremath{%
3034 \ifcase#1\or
3035 * \or \dagger \or
3036 \ddagger \or \mathsection \or
3037 \mathparagraph\or
3038 ** \or \dagger\dagger \or
3039 \ddagger\ddagger \or \mathsection \mathsection \or
3040 \mathparagraph\mathparagraph\or
3041 *{*}\ignorespaces \or \dagger\dagger\dagger \or
3042 \ddagger\ddagger\ddagger\or \mathsection \mathsection \mathsection \or
3043 \mathparagraph\mathparagraph\mathparagraph\or
3044 \else
3045 \ctrerr
3046 \fi
3047 }%
3048 }%

\titlepage
3049 \renewenvironment{titlepage}{%
3050 \let\wastwocol@sw\twocolumn@sw
3051 \onecolumngrid
3052 \newpage
3053 \thispagestyle{titlepage}%
3054 \c@page\z@ article sets this to one not zero???
3055 }{%
3056 \wastwocol@sw{\twocolumngrid}{\newpage}%
3057 }%

\frontmatter@abstractheading APS Journals all set the abstract head the same way, with no head. However,
if the user has specified the preprint class option, then the abstract will have a
head.
3058 \def\frontmatter@abstractheading{%
3059 \preprintsty@sw{%
3060 \begingroup
3061 \centering\large
3062 \abstractname
3063 \par
3064 \endgroup
3065 }{}}%
3066 }%

\frontmatter@abstractwidth All APS journals set the abstract to the same width.
3067 \def\frontmatter@abstractwidth{400\p@}%
```

`\frontmatter@abstractfont` All APS journals set the abstract body the same way.

```
3068 \def\frontmatter@abstractfont{%
3069 \small
3070 \parindent1em\relax
3071 \adjust@abstractwidth
3072 }%
3073 \def\adjust@abstractwidth{%
3074 \dimen@\textwidth\advance\dimen@-\frontmatter@abstractwidth
3075 \divide\dimen@\tw@
3076 \galley@sw{%
3077 \advance\rightskip\tw@\dimen@
3078 }{%
3079 \advance\leftskip\dimen@
3080 \advance\rightskip\dimen@
3081 }%
3082 }%
```

All APS journal preprints use separate titlepage and full-width abstract.

Note that we defer polling the `\preprintsty@sw` Boolean until `\AtBeginDocument` time, because the document preamble may legitimately change the state of that variable.

```
3083 \appdef\class@documenthook{%
3084 \preprintsty@sw{%
3085 \@ifxundefined\titlepage@sw{\@booleantrue\titlepage@sw}{}%
3086 % \tightenlines@sw{%
3087 % \def\baselinestretch{1}%
3088 % }{%
3089 % \def\baselinestretch{1.5}%
3090 % }%
3091 \def\frontmatter@abstractwidth{\textwidth}%
3092 \def\frontmatter@affiliationfont{\it}%
3093 \let\section\section@preprintsty
3094 % \let\@hangfrom\@hangfrom@section@preprintsty
3095 \let\subsection\subsection@preprintsty
3096 \let\subsubsection\subsubsection@preprintsty
3097 }{%
3098 }%
```

`\frontmatter@authorformat` All APS journals set the author list the same. The leading is 11.5 points, and there is 11.5 points of extra space above the first author line (which amounts to the same thing as 11.5 points extra below the title) for a total of 23 points base-to-base.

```
3099 \def\frontmatter@authorformat{%
3100 \skip@\@flushglue
3101 \@flushglue\z@ plus.3\hspace\relax
3102 \centering
3103 \advance\baselineskip\p@
3104 \parskip11.5\p@\relax
3105 \@flushglue\skip@
3106 %\preprintsty@sw}{%
```

```

3107 % \addvspace{0\p@}%
3108 }%
3109 }%

\frontmatter@above@affilgroup The default amount of space above affiliation. APS Journals have 24 points b-b
above an affiliation group.
3110 \def\frontmatter@above@affilgroup{%
3111 %\preprintsty@sw}{%
3112 % \addvspace{11\p@}%
3113 }%
3114 }%

\frontmatter@above@affiliation The default amount of space above affiliation. APS Journals have no extra space
matter@above@affiliation@script between author group down to common affiliation.
3115 \def\frontmatter@above@affiliation@script{%
3116 \skip@\@flushglue
3117 \@flushglue\z@ plus.3\hsize\relax
3118 \centering
3119 \@flushglue\skip@
3120 \addvspace{3.5\p@}%
3121 }%
3122 \def\frontmatter@above@affiliation{%
3123 \preprintsty@sw}{%
3124 % \addvspace{12\p@}%
3125 }%
3126 }%

\frontmatter@affiliationfont All APS journals set the affiliation the same.
3127 \def\frontmatter@affiliationfont{%
3128 \small\it
3129 }%

\frontmatter@collaboration@above PRL: 1.5 points extra: 13 points base-to-base above.
3130 \def\frontmatter@collaboration@above{%
3131 \preprintsty@sw{%
3132 }{%
3133 \parskip1.5\p@\relax
3134 }%
3135 }%

Set up the default APS style for title block authors and affiliations.
3136 \@ifxundefined\groupauthors@sw{%
3137 \clo@groupedaddress
3138 }{}%

\frontmatter@setup All APS journals set the title page using the same font and size. However, justifi-
cation varies for the title block elements, so we assert none here.
3139 \def\frontmatter@setup{%
3140 \normalfont
3141 }%

```

`\frontmatter@title@above` All APS journals set the article title the same.

`\frontmatter@title@format` Note: Spacing from title to author is 23 points base-to-base.

`\frontmatter@title@below` 3142 `\def\frontmatter@title@above{\addvspace{6\p@}}%`
3143 `\def\frontmatter@title@format{\large\bfseries\centering\parskip\z@skip}%`
3144 `\def\frontmatter@title@below{}`%

`\frontmatter@makefnmark` All APS journals share this procedure for setting the titlepage footnote text.

3145 `\def\@author@parskip{3\p@}%`
3146 `\def\frontmatter@makefnmark{%`
3147 `\@textsuperscript{%`
3148 `\normalfont\@thefnmark`
3149 `}%`
3150 `}%`
3151 `\def\frontmatter@authorbelow{%`
3152 `\addvspace{3\p@}%`
3153 `}%`

`\frontmatter@RRAP@format` All APS journals use the same format for the “Received, Revised, etc.” block on the title page.

Change note: 11.5 points b-b from author/affiliation down to date.

3154 `\def\frontmatter@RRAP@format{%`
3155 `\small`
3156 `\centering`
3157 `% \preprintsty@sw{\parskip.5ex\relax}%`
3158 `\everypar{\hbox\bgroup(\@gobble@leavemode@uppercase}%`
3159 `\def\par{\@ifvmode{\unskip}\egroup\@par}}%`
3160 `}%`
3161 `\def\punct@RRAP{;\egroup\hbox\bgroup}%`
3162 `\def\@gobble@leavemode@uppercase#1#2{\expandafter\MakeTextUppercase}%`

`\frontmatter@PACS@format`

3163 `\def\frontmatter@PACS@format{%`
3164 `\addvspace{11\p@}%`
3165 `\footnotesize`
3166 `\adjust@abstractwidth`
3167 `\parindent\z@`
3168 `\parskip\z@skip`
3169 `\samepage`
3170 `}%`

`\frontmatter@keys@format`

3171 `\def\frontmatter@keys@format{%`
3172 `\footnotesize`
3173 `\adjust@abstractwidth`
3174 `\parindent\z@`
3175 `\samepage`
3176 `}%`

`\ps@titlepage` Title page style. Currently empty except for preprint header, which consists of all the `\preprint` arguments, stacked flush right at the right margin.

```

3177 \def\ps@titlepage{%
3178   \def\@oddhead{%
3179     \hfill
3180     \produce@preprints\@preprint
3181   }%
3182   \let\@evenhead\@oddhead
3183   \def\@oddfoot{%
3184     \hb@xt@\z@\{byrevtex\hss\}%
3185     \hfil
3186     \preprintsty@sw{\thepage}{}%
3187     \quad\checkindate
3188     \hfil
3189   }%
3190   \let\@evenfoot\@oddfoot
3191 }%
3192 \def\byrevtex{\byrevtex@sw{Typeset by REV\TeX}{}}%

```

`\produce@preprints`

```

3193 \def\produce@preprints#1{%
3194   \preprint@sw{%
3195     \vtop to \z{%
3196       \def\baselinestretch{1}%
3197       \small
3198       \let\preprint\preprint@count
3199       \count@\z@#1@ifnum{\count@>\tw@}{%
3200         \hbox{%
3201           \let\preprint\preprint@hlist
3202           #1\setbox\z@\lastbox
3203         }%
3204       }{%
3205         \let\preprint\preprint@cr
3206         \halign{\hfil##\cr#1\cr}%
3207         \par
3208         \vss
3209       }%
3210     }%
3211   }{%
3212 }%
3213 \def\preprint@cr#1{#1\cr}%
3214 \def\preprint@count#1{\advance\count@\@ne}%
3215 \def\preprint@hlist#1{#1\hbox{, }}%

```

28.3.2 Stacked Heads

All APS journals put a period (.), followed by quad space, after the section number. Also, no hanging section number.

```

3216 \def\@seccntformat#1{\csname the#1\endcsname.\quad}%

```

```
3217 \def\@hangfrom#1#2#3{#1#2#3}%
```

Note that in the following, we wish to set the section head uppercase, so we use David Carlisle's `\MakeTextUppercase`. However, because this procedure effectively parses its argument (looking for things to *not* translate), it has to be invoked in such a way that the argument of the `\section` command is passed to it as its own argument.

To accomplish this, we use the `\@hangfrom@` hook, which was developed for this purpose.

```
3218 \def\section{%
3219   \@startsection
3220   {section}%
3221   {1}%
3222   {\z@}%
3223   {0.8cm \@plus1ex \@minus .2ex}%
3224   {0.5cm}%
3225   {%
3226     \normalfont\small\bfseries
3227     \centering
3228   }%
3229 }%
3230 \def\@hangfrom@section#1#2#3{\@hangfrom{#1#2}\MakeTextUppercase{#3}}%
3231 \def\subsection{%
3232   \@startsection
3233   {subsection}%
3234   {2}%
3235   {\z@}%
3236   {.8cm \@plus1ex \@minus .2ex}%
3237   {.5cm}%
3238   {%
3239     \normalfont\small\bfseries
3240     \centering
3241   }%
3242 }%
3243 \def\subsubsection{%
3244   \@startsection
3245   {subsubsection}%
3246   {3}%
3247   {\z@}%
3248   {.8cm \@plus1ex \@minus .2ex}%
3249   {.5cm}%
3250   {%
3251     \normalfont\small\itshape
3252     \centering
3253   }%
3254 }%
```

28.3.3 Runin Heads

```

3255 \def\paragraph{%
3256   \@startsection
3257   {paragraph}%
3258   {4}%
3259   {\parindent}%
3260   {\z@}%
3261   {-1em}%
3262   {\normalfont\normalsize\itshape}%
3263 }%

3264 \def\subparagraph{%
3265   \@startsection
3266   {subparagraph}%
3267   {5}%
3268   {\parindent}%
3269   {3.25ex \@plus1ex \@minus .2ex}%
3270   {-1em}%
3271   {\normalfont\normalsize\bfseries}%
3272 }%

```

\section@preprintsty Here are the formatting procedures specific to the preprint style; the only difference
\subsection@preprintsty is that the heads are flush left instead of centered.

```

\subsubsection@preprintsty 3273 \def\section@preprintsty{%
3274   \@startsection
3275   {section}%
3276   {1}%
3277   {\z@}%
3278   {0.8cm \@plus1ex \@minus .2ex}%
3279   {0.5cm}%
3280   {%
3281     \normalfont\small\bfseries
3282   %   \centering
3283   }%
3284 }%
3285 %\def\@hangfrom@section@preprintsty#1#2#3{\@hangfrom{#1#2}\MakeTextUppercase{#3}}%

3286 \def\subsection@preprintsty{%
3287   \@startsection
3288   {subsection}%
3289   {2}%
3290   {\z@}%
3291   {.8cm \@plus1ex \@minus .2ex}%
3292   {.5cm}%
3293   {%
3294     \normalfont\small\bfseries
3295   %   \centering
3296   }%
3297 }%

3298 \def\subsubsection@preprintsty{%
3299   \@startsection
3300   {subsubsection}%

```

```

3301     {3}%
3302     {\z@}%
3303     {.8cm \@plus1ex \@minus .2ex}%
3304     {.5cm}%
3305     {%
3306     \normalfont\small\itshape
3307 %    \centering
3308     }%
3309 }%

```

Effectively invoke the `bibnote` class option, if `\frontmatter@footnote@produce` has not yet been set.

```

3310 \@ifxundefined\frontmatter@footnote@produce{%
3311 \let\frontmatter@footnote@produce\frontmatter@footnote@produce@endnote
3312 }{}%

```

28.3.4 Table of Contents

The `toc` will itself make an entry in the `toc`, but we temporarily turn off `toc` formatting for the duration.

```

3313 \def\@pnumwidth{1.55em}
3314 \def\@tocrmarg {2.55em}
3315 \def\@dotsep{4.5pt}
3316 \setcounter{tocdepth}{3}

3317 \def\tableofcontents{%
3318 \addtocontents{toc}{\string\tocdepth@munge}%
3319 \print@toc{toc}%
3320 \addtocontents{toc}{\string\tocdepth@restore}%
3321 }%

3322 \def\tocdepth@munge{%
3323 \let\l@section@saved\l@section
3324 \let\l@section@gobble@tw@
3325 }%
3326 \def@gobble@tw@#1#2{}%

3327 \def\tocdepth@restore{%
3328 \let\l@section\l@section@saved
3329 }%

3330 \def\l@part#1#2{\addpenalty{\@secpenalty}%
3331 \begingroup
3332 \set@tocdim@pagenum{#2}%
3333 % \@tempdima 3em %
3334 \parindent \z@
3335 \rightskip\tocleft@pagenum plus 1fil\relax
3336 \skip@\parfillskip\parfillskip\z@
3337 \addvspace{2.25em plus\p@}%
3338 \large \bf %
3339 \leavevmode\ignorespaces#1\unskip\nobreak\hskip\skip@

```



```

3340 \hb@xt@\rightskip{\hfil\unhbox\z@}\hskip-\rightskip\hskip\z@skip
3341 \par
3342 \nobreak %
3343 \endgroup
3344 }%

```

`\l@section` Determine which TOC elements are automatically indented.

```

3345 \def\tocleft@{\z@}%
3346 \def\tocdim@min{5\p@}%
3347 \def\l@section{%
3348 \l@sections{}{section}% Implicit #3#4
3349 }%
3350 \def\l@f@section{%
3351 \addpenalty{\@secpenalty}%
3352 \addvspace{1.0em plus\p@}%
3353 \bf
3354 }%
3355 \def\l@subsection{%
3356 \l@sections{section}{subsection}% Implicit #3#4
3357 }%
3358 \def\l@subsubsection{%
3359 \l@sections{subsection}{subsubsection}% Implicit #3#4
3360 }%
3361 \def\l@paragraph#1#2{%
3362 \def\l@subparagraph#1#2{%

```

Activate the auto TOC processing.

```

3363 \let\toc@pre\toc@pre@auto
3364 \let\toc@post\toc@post@auto
3365 \def\listoffigures{\print@toc{lof}}%
3366 \def\l@figure{\@dottedtocline{1}{1.5em}{2.3em}}
3367 \def\listoftables{\print@toc{lot}}%
3368 \let\l@table\l@figure

```

28.3.5 Default column bottom

All APS journal styles have flush bottoms.

Note that we defer polling the `\raggedcolumn@sw` Boolean until `\AtBeginDocument` time, because the document preamble may legitimately change the state of that variable.

```

3369 \apptdef\class@documenthook{%
3370 \@ifxundefined\raggedcolumn@sw{\@booleantrue\raggedcolumn@sw}{}%
3371 \raggedcolumn@sw{\raggedbottom}{\flushbottom}%
3372 }%

```

28.3.6 Table alignment style

```

\tableft@skip@float All APS publications have the same table specification: Scotch rules above and
\tabmid@skip@float below, centered in column.
\tabright@skip@float
\array@row@pre@float
\array@row@pst@float

```

```

3373 \def\tableft@skip@float{\z@ plus\hsize}%
3374 \def\tabmid@skip@float{\@flushglue}%
3375 \def\tabright@skip@float{\z@ plus\hsize}%
3376 \def\array@row@pre@float{\hline\hline\noalign{\vskip\doublerulesep}}%
3377 \def\array@row@pst@float{\noalign{\vskip\doublerulesep}\hline\hline}%

```

28.3.7 Footnote formatting

We customize the formatting of footnotes for all APS journals.

```

\@makefntext
3378 \def\@makefntext#1{%
3379 \def\baselinestretch{1}%
3380 \reset@font
3381 \footnotesize
3382 \leftskip1em
3383 \parindent1em
3384 \noindent\nobreak\hskip-\leftskip
3385 \hb@xt@\leftskip{%
3386 \Hy@raisedlink{\hyper@anchorstart{footnote@the\c@footnote}\hyper@anchorend}%
3387 \hss\@makefnmark\
3388 }%
3389 #1%
3390 \par
3391 }%

```

28.3.8 Appendix

```

\appendix
\@hangfrom@appendix 3392 \prepdef\appendix{%
\@hangfroms@appendix 3393 \par
\@appendixcntformat 3394 \let\@hangfrom@section\@hangfrom@appendix
3395 \let\@hangfroms@section\@hangfroms@appendix
3396 \let\@sectioncntformat\@appendixcntformat
3397 }%
3398 \def\@hangfrom@appendix#1#2#3{%
3399 #1%
3400 \@ifempty{#2}{%
3401 #3%
3402 }{%
3403 #2\@ifempty{#3}{-:\ #3}%
3404 }%
3405 }%
3406 \def\@hangfroms@appendix#1#2{%
3407 #1#2%
3408 }%
3409 \def\@appendixcntformat#1{\appendixname \csname the#1\endcsname}%

```

28.3.9 Bibliography

Customize REVTeX for the journal substyle; this task requires three components: the BibTeX `apsrev.bst` style file, customizing code for `natbib`, and customizations of the `thebibliography` environment.

`\@bibstyle` Define the argument of the `\bibliographystyle` command (if the document does not do so). The user must have installed a `.bst` file of the corresponding name. This file will then be used by BibTeX when compiling the document's `.bbl` file.

The default bibliography style for the APS journal substyles, `apsrev.bst`, was originally called `revtex.bst`, but that name is much too generic and should be given to a `.bst` file that that applies generally to any REVTeX journal substyle, an impossibility.

To generate `apsrev.bst`, use `custom-bib` version 4.0b2 or later. Run the `.bst` generator, `makebst.tex`, and accept all defaults, with the following exceptions:

1. ORDERING OF REFERENCES: c: seq-no (references in order of Citation);
2. AUTHOR NAMES: i: nm-init,ed-au (Initials + surname);
3. NUMBER OF AUTHORS: l: max 12, min 12 (there will be three prompts total);
4. TYPEFACE FOR AUTHORS IN LIST OF REFERENCES: u: nmft,nmft-def (User defined author font);
5. FONT FOR FIRST NAMES: u: fnm-def (First names in user defined font);
6. EDITOR NAMES IN INCOLLECTION ETC: a: nmfted (Editors in collection like authors);
7. DATE FORMAT: p: yr-par (Date in parentheses);
8. SUPPRESS MONTH: x: xmth (Date is year only);
9. TITLE OF ARTICLE: i: tit-it (Title italic)
10. ARTICLE TITLE PRESENT: x: jtit-x (No article title);
11. JOURNAL NAME FONT: r: jtll-rm (Journal title normal);
12. TECHNICAL REPORT TITLE: b: trtit-b (Tech. report title like books);
13. JOURNAL VOLUME: b: vol-bf (Volume bold);
14. VOLUME PUNCTUATION: c: volp-com (Volume with comma);
15. PAGE NUMBERS: f: jpg-1 (Only start page number);
16. JOURNAL NAME PUNCTUATION: x: jnm-x (Space after journal);
17. PUBLISHER IN PARENTHESES: d: pub-date (Publisher and date in parentheses);

18. PUBLISHER POSITION: p: pre-pub (Publisher before chapter, pages);
19. ISBN NUMBER: isbn: (Include ISBN for books, booklets)
20. ISSN NUMBER: issn: (Include ISSN for periodicals)
21. EDITOR IN COLLECTIONS: b: edby (Booktitle, edited by ...);
22. PUNCTUATION BETWEEN SECTIONS (BLOCKS): c: blk-com (Comma between blocks);
23. ABBREVIATE WORD 'PAGES': a: pp ('Page' abbreviated);
24. ABBREVIATE WORD 'EDITORS': a: ed ('Editor' abbreviated);
25. OTHER ABBREVIATIONS: a: abr (Abbreviations);
26. ABBREVIATION FOR 'EDITION': a: ednx ('Edition' abbreviated as 'ed');
27. EDITION NUMBERS: n: ord (Numerical editions);
28. STORED JOURNAL NAMES: a: jabr (Abbreviated journal names);
29. FONT OF 'ET AL': i: etal-it (Italic et al);
30. ADDITIONAL REVTeX DATA FIELDS: r: revdata, eprint, url, url-blk (Include REVTeX data fields collaboration, eid, eprint, numpages, url)
31. NEW FONT SELECTION SCHEME: n: nfss (NFSS);
32. ADDITIONAL REVTeX DATA FIELDS: y: revdata (additional data fields);
33. REFERENCE COMPONENT TAGS: y: reference component tags;
34. URL ADDRESS: n: URL as note;

A file `apsrev.dbj` file equivalent to the following should result:

```
% \input docstrip
% \preamble
% -----
% *** REVTeX-compatible apsrev.bst ***
% \endpreamble
% \postamble
% End of customized bst file
% \endpostamble
% \keepsilent
% \askforoverwritefalse
% \def\MBopts{\from{merlin.mbs}{%
%   seq-no%: Citation order (unsorted, like unsrt.bst)
%   ,nm-init,ed-au%: Initials + surname (J. F. Smith)
%   ,nmlm%: Limited authors (et al replaces missing names)
```

```

% ,x10%: Maximum of 10 authors
% ,m10%: Minimum of 10 authors
% ,nmft,nmft-def%: User defined author font (\bibnamefont)
% ,fnm-def%: First names in user defined font (\bibfnamefont)
% ,nmfted%: Editors incollection like authors font
% ,yr-par%: Date in parentheses as (May 1993)
% ,xmth%: Date is year only
% ,tit-it%: Title italic (\em)
% ,jtitt-x%: No article title
% ,jtitt-rm%: Journal name normal font
% ,trtit-b%: Tech. report title like books
% ,vol-bf%: Volume bold as {\bf vol}(num)
% ,volp-com%: Volume with comma as vol(num), ppp
% ,jpg-1%: Only start page number
% ,jnm-x%: Space after journal name
% ,pub-date%: Publisher and date in parentheses (Oxford, 1994)
% ,pre-pub%: Publisher before chapter, pages
% ,isbn%: Include ISBN for books, booklets, etc.
% ,issn%: Include ISSN for periodicals
% ,edby%: In booktitle, edited by .. (where .. is names)
% ,blk-com%: Comma between blocks
% ,pp%: 'Page' abbreviated as p. or pp.
% ,ed%: 'Editor' abbreviated as ed. or eds.
% ,abr%: Abbreviations of such words
% ,ednx%: 'Edition' abbreviated as 'ed'
% ,ord%: Numerical editions as 1st, 2nd, 3rd, etc
% ,jabr%: Abbreviated journal names
% ,etal-it%: Italic et al
% ,revdata,eprint,url,url-blk%: Include REVTeX data fields collaboration, eid, eprint, numpages
% ,url,url-nt%: URL as note
% ,bibinfo%: Reference component tags like \bibinfo in the content of \bibitem
% ,nfss%: NFSS use \textbf, \emph, not \bf, \em
%   }}
% \generate{\file{\jobname.bst}{\MBopts}}
% \endbatchfile
%

```

To get a banner in the .blg file, patch by hand into `apsrev.bst`:

```

% FUNCTION {banner.log} {"REVTeX-compatible apsrev.bst 9812" warning$}
%

```

and invoke `banner.log` from within `begin.bib`

We ensure that the journal substyle has the first word in the matter by installing the (default) APS code later on (see Section 28.5).

`\bibpunct` The following commands effectively establish the style in which `\cite` commands are formatted. You can think of them as the second needed component for the bibliography.

Set up for numerical citations.

The journal substyles can override these choices.
 Note that setting `\NAT@sort` at this late hour is not totally effective. You have to give `natbib` the relevant options at load time.

```
3410 \bibpunct{[]-[]}{,}{n}{-}{,}{,}
```

`\bibsection` We define the sectioning command to use when starting the bibliography.

```
3411 \def\bibsection{%
3412   \par
3413   % \twocolumn@sw{\onecolumngrid}{}%
3414   \onecolumngrid@push
3415   \beginingroup
3416   \baselineskip26\p@
3417   % \def\@currentHref{section.bib}%
3418   \bib@device{\textwidth}{245.5\p@}%
3419   \endgroup
3420   \nobreak\@nobreaktrue
3421   \addvspace{19\p@}%
3422   \par
3423   % \twocolumn@sw{\twocolumngrid}{}%
3424   \onecolumngrid@pop
3425   }%
```

`\bib@device` We define the sectioning command to use when starting the bibliography.

```
\bibpreamble 3426 \def\bib@device#1#2{%
  \bibsep 3427 \hb@xt@#1{%
    \newblock 3428 \hfil
      3429 \phantomsection
      3430 \addcontentsline {toc}{section}{\protect\numberline{}\refname}%
      3431 % \hyper@anchorstart {\@currentHref }%
      3432 \hb@xt@#2{%
      3433   \skip@z@\@plus-1fil\relax
      3434   \leaders\hrule height.25 \p@ depth.25 \p@ \hskipz@\@plus1fil
      3435 \hskip\skip@
      3436 \hskipz@\@plus0.125fil\leaders\hrule height.375\p@ depth.375\p@ \hskipz@\@plus0.75fil \hskip\
      3437 \hskip\skip@
      3438 \hskipz@\@plus0.25 fil\leaders\hrule height.5 \p@ depth.5 \p@ \hskipz@\@plus0.5 fil \hskip\
      3439 \hskip\skip@
      3440 \hskipz@\@plus0.375fil\leaders\hrule height.625\p@ depth.625\p@ \hskipz@\@plus0.25fil \hskip\
      3441 % \hskip\skip@
      3442 % \hfil
      3443 }%
      3444 %\hyper@anchorend
      3445 \hfil
      3446 }%
      3447 }%
      3448 \let\bibpreamble\@empty
      3449 \bibsepz@\relax
      3450 \def\newblock{\ }
```

`\bibfont` We define the font switch that applies to the body of the bibliography.

```
3451 \def\bibfont{%  
3452 \small  
3453 }%
```

28.3.10 Index

FIXME: the following call to `\twocolumn` appears wrong if we were in two-column grid.

```
3454 \newenvironment{theindex}{%  
3455 %\let\wastwocol@sw\twocolumn@sw  
3456 \columnseprule \z@  
3457 \columnsep 35\p@  
3458 \c@secnumdepth-\maxdimen  
3459 \onecolumngrid@push  
3460 \section{\indexname}%  
3461 \thispagestyle{plain}%  
3462 \parindent\z@  
3463 \parskip\z@ plus.3\p@\relax  
3464 \let\item\idxitem  
3465 %\wastwocol@sw{\twocolumngrid}{}%  
3466 \onecolumngrid@pop  
3467 }{%  
3468 %\onecolumngrid@pop  
3469 }%  
3470 %  
3471 \def\@idxitem{\par\hangindent 40\p@}  
3472 %  
3473 \def\subitem{\par\hangindent 40\p@ \hspace*{20\p@}}  
3474 %  
3475 \def\subsubitem{\par\hangindent 40\p@ \hspace*{30\p@}}  
3476 %  
3477 \def\indexspace{\par \vskip 10\p@ plus5\p@ minus3\p@\relax}
```

28.4 Journal-Specific Code

For APS journals, we supply code specific to PRA, PRB, PRC, PRD, PRE, PRL, and RMP. At present, they are identical, with the exception of PRB's code for superscript citations.

```
3478 \def\journal@pra{pra}%  
3479 \def\journal@prb{prb}%  
3480 \def\journal@prc{prc}%  
3481 \def\journal@prd{prd}%  
3482 \def\journal@pre{pre}%  
3483 \def\journal@prl{prl}%  
3484 \def\journal@prstab{prstab}%  
3485 \def\journal@rmp{rmp}%
```

Note: the convention in this document class is that the substyle must not override any explicit class options declared by the document. This means that the various Booleans of Section 7 may be assigned here only if they are still undefined at this point.

For most all of the APS journals, the journal-dependent code is relatively meager and is therefore embedded in this file. However, the RMP code is sufficiently extensive that splitting it out into a separate file is more convenient.

28.4.1 pra

```
3486 \@ifx{\@journal\journal@pra}{%
```

End of pra code.

```
3487 }{ }%
```

28.4.2 prb

```
3488 \@ifx{\@journal\journal@prb}{%
```

PRB requires superscript citations. We use Patrick Daly's `natbib` package, and `hyperref` and other packages are already set up to cope with this.

`\bibpunct` By default, PRB selects the `bibnotes` option. We also set up for numerical citations.

```
3489 \@ifxundefined\bibnotes@sw{\@booleantrue\bibnotes@sw}{ }%
```

```
3490 \bibpunct{ }{ }{ }{ }{ }{\textsuperscript{ } }%
```

```
3491 \def\@onlinecite#1{\begingroup\let\@cite\NAT@citenum\citealp{#1}\endgroup}%
```

Invoke `superbib` option if the document has made no selection of its own.

```
3492 \appdef\class@documenthook{%
```

```
3493 \@ifxundefined\place@bibnumber{%
```

```
3494 \let\place@bibnumber\place@bibnumber@sup
```

```
3495 }{ }%
```

```
3496 }%
```

End of prb code.

```
3497 }{ }%
```

28.4.3 prc

```
3498 \@ifx{\@journal\journal@prc}{%
```

End of prc code.

```
3499 }{ }%
```

28.4.4 prd

```
3500 \@ifx{\@journal\journal@prd}{%
```

End of prd code.

```
3501 }{ }%
```

28.4.5 pre

```
3502 \@ifx{\@journal\journal@pre}{%
```


End of prd code.

```

3503 }{}%
28.4.6 prl
3504 \@ifx{\@journal\journal@prl}{%
In PRL, the default is the bibnotes option, and the Acknowledgments section has
no head.
However, the References head is a device that may be described as a lozenge
centered on the baseline, 71 points wide by 2 points thick, with the ends tapering
to a half point in thickness. Space above 26 points base to base, below 31 base to
base.
3505 \@ifxundefined\bibnotes@sw{\@booleantrue\bibnotes@sw}{}%
3506 \@booleanfalse\acknowledgments@sw
3507 %\let\acknowledgmentsname\@empty
3508 \def\bibsection{%
3509 \par
3510 \begingroup
3511 \baselineskip26\p@
3512 \bib@device{\hsize}{72\p@}%
3513 \endgroup
3514 \nobreak\@nobreaktrue
3515 \addvspace{19\p@}%
3516 }%
Implement length checking. Use the times and mathtime packages, plus whatever
other processing is required to make the formatted output be true to the metrics
of the journal.
Wait. Do not use mathtime after all. APS has their own way of doing math
pi, involving Adobe Mathematical Pi and other fonts.
3517 %\appdef\class@documenthook{%
3518 \@ifxundefined\lengthcheck@sw{\@booleanfalse\lengthcheck@sw}{}%
3519 \lengthcheck@sw{%
3520 \RequirePackage{times}%
3521 % \RequirePackage{mathtime}%
3522 }{%
3523 }%
3524 }}%
A PRL does not have numbered sections.
3525 \c@secnumdepth=-\maxdimen
Note: we defer this code until after type size file is read in.
3526 \appdef\set@typesize@hook{%
3527 \@ifnum{\@pointsize=10\relax}{%
3528 \lengthcheck@sw{%
3529 \def\large{%
3530 \@setfontsize\large{12.5}{14\p@}%
3531 }%
3532 \def\normalsize{%
3533 \@setfontsize\normalsize{10.5}\@xiipt

```

```

3534 \abovedisplayskip 6\p@ \@plus6\p@ \@minus5\p@
3535 \belowdisplayskip \abovedisplayskip
3536 \abovedisplayshortskip \abovedisplayskip
3537 \belowdisplayshortskip \abovedisplayskip
3538 \let\@listi\@listI
3539 }%
3540 \def\small{%
3541 \setfontsize\small{9.5}\@xipt
3542 \abovedisplayskip 5\p@ \@plus5\p@ \@minus4\p@
3543 \belowdisplayskip \abovedisplayskip
3544 \abovedisplayshortskip \abovedisplayskip
3545 \belowdisplayshortskip \abovedisplayskip
3546 \let\@listi\@listI
3547 }%
3548 \DeclareMathSizes{12.5}{12.5}{9}{6}%
3549 \DeclareMathSizes{10.5}{10.5}{7.5}{5}%
3550 \DeclareMathSizes{9.5}{9.5}{7.0}{5}%
3551 }-%
3552 \def\normalsize{%
3553 \setfontsize\normalsize\@xpt\@xipt
3554 \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
3555 \belowdisplayskip \abovedisplayskip
3556 \abovedisplayshortskip \abovedisplayskip
3557 \belowdisplayshortskip \abovedisplayskip
3558 \let\@listi\@listI
3559 }%
3560 }%
3561 }-%
3562 }%
3563 %\appdef\set@pica@hook{%
3564 \ifnum{\@pointsize=10\relax}{-%
3565 \textheight = 694.0\p@
3566 % \textheight = 55\baselineskip
3567 % \advance\textheight by \topskip
3568 }-%
3569 }%

```

End of prl code.

```

3570 }-%

```

28.4.7 prstab

```

3571 \ifx{\@journal\journal@prstab}{-%

```

End of prstab code.

```

3572 }-%

```

28.4.8 rmp

Read in the code from a file.

```

3573 \ifx{\@journal\journal@rmp}{\input{\@journal\substyle@ext}}-%

```

28.5 Establish APS Defaults

```
\footinbib@sw All APS journals except RMP invoke the footinbib option. We rely on the
RMP-specific code to give a value to this switch.
3574 \@ifxundefined\footinbib@sw{\@booleantrue\footinbib@sw}{}%

\place@bibnumber We install code that will select the presentation for \bibitems and govern the
\@bibstyle BIBTEX processing. If the user has not selected any related option and if the
journal substyle also has not, then the aps option choses these defaults.
3575 \appdef\class@documenthook{%
3576 \@ifxundefined\place@bibnumber{%
3577 \let\place@bibnumber\place@bibnumber@inl
3578 }{)%
3579 \@ifxundefined\@bibstyle{%
3580 \def\@bibstyle{apsrev}%
3581 }{)%
3582 }%

3583 %</aps>
```

29 The rmp journal substyle: the rmp module

The file `rmp.rtx` is read in by the `revtex4` document class if `\@society` has the value `aps` and `\@journal` has the value `rmp`.

It is read at the end of the `revtex4.dtxaps.rtx`, so all definitions and assignments in that file are operative unless overridden here.

```
3584 %<*rmp>
```

Protect this file from being read in by anything but REVTeX.

```
3585 \ifx\undefined\substyle@ext
3586 \def\@tempa{%
3587 \endinput
3588 \GenericWarning{I must be read in by REVTeX! (Bailing out)}%
3589 }%
3590 \expandafter\else
3591 \def\@tempa{%
3592 \expandafter\fi\@tempa
```

Protect this file from being read in as a society instead of a journal. In such a case, `\@journal` will be `\@empty`.

```
3593 \@ifx@empty\@journal{%
3594 \class@warn{I have to read in the aps substyle first!}%
3595 \endinput
3596 \def\@society{aps}\def\@journal{rmp}%
3597 \expandafter\input\expandafter{\@society\substyle@ext}%
3598 }{)%
```

29.1 Frontmatter

`\frontmatter@setup`

```
3599 \def\frontmatter@setup{%
3600 \normalfont\sffamily\raggedright
3601 }%
```

`\PACS@warn` Per Mark Doyle, RMP never displays the PACS, so they don't want the 'use showpacs' warning spit out.

```
3602 \def\PACS@warn{RMP documents do not display PACS. Your \string\pacs\space will be ignored}%
```

`\frontmatter@title@above`

```
\frontmatter@title@format 3603 \def\frontmatter@title@above{}%
```

`\frontmatter@title@below` 3604 `\def\frontmatter@title@format{\Large\bfseries\raggedright}% HelveticaNeue-Medium(Italic) 14pt.`

```
3605 \def\frontmatter@title@below{\addvspace{12\p@}}% 24pt b-b down to first author
```

`\frontmatter@authorformat` Set the rag to a milder value, because we want to do true ragged right typesetting, as opposed to the L^AT_EX default, which gives very poor results.

Note: author font is 9.8bp. 19.2bp/14.3bp above/below.

```
3606 \def\frontmatter@authorformat{%
3607 \preprintsty@sw{\vskip0.5pc\relax}{}%
3608 \@tempskipa\@flushglue
3609 \@flushglue\z@ plus50\p@\relax
3610 \raggedright\advance\leftskip.5in\relax
3611 \@flushglue\@tempskipa
3612 \parskip\z@skip
3613 }%
```

`\frontmatter@affiliationfont` The hook `\frontmatter@affiliationfont` controls the formatting of affiliations and affiliation groups. The hook `\frontmatter@above@affilgroup` is invoked just before proceeding with author/affiliation processing. The `\frontmatter@above@affiliation` is the amount of space above affiliations in the `groupedaddress` style, and `\frontmatter@above@affiliation@script` is that for `superscriptaddress`.

Note: affiliation font is 9.03/10.4bp, 14.3bp/19.2bp b-b above/below

```
3614 \def\frontmatter@affiliationfont{% Helvetica 9/10.2
3615 \small\slshape\selectfont\baselineskip10.5\p@\relax
3616 \@tempskipa\@flushglue
3617 \@flushglue\z@ plus50\p@\relax
3618 \raggedright\advance\leftskip.5in\relax
3619 \@flushglue\@tempskipa
3620 }%
3621 \def\frontmatter@above@affilgroup{\addvspace{7.2\p@}}% additional leading above an author
3622 \def\frontmatter@above@affiliation{\addvspace{5.3\p@}}%
3623 \def\frontmatter@above@affiliation@script{}%
```

Set up the default RMP style for title block authors and affiliations. This command should effectively override the effect of the corresponding command in the parent substyle.

```

3624 \@ifundefined\groupauthors@sw{%
3625 \clo@groupedaddress
3626 }{}%

```

`\frontmatter@RRAP@format` Note: in RMP, if we are not in preprint mode, the date will not be produced.
Note: Helvetica C/lc, 8.98bp, space above: 16.3bp b-b.

```

3627 \def\frontmatter@RRAP@format{%
3628 \addvspace{7.3\p@}%
3629 \small
3630 \raggedright\advance\leftskip.5in\relax
3631 % \parskip.5ex\relax
3632 % \everypar{\hbox\bgroup(\@gobble@leavemode@uppercase)}%
3633 % \def\par{\@ifvmode{\unskip}\egroup\@par}}%
3634 % \preprintsty@sw{\let\@date\empty}%
3635 }%
3636 %\def\@gobble@leavemode@uppercase#1#2{\expandafter\MakeTextUppercase}%
3637 \def\produce@RRAP#1{%
3638 \@ifempty{#1}{}{%
3639 \@ifvmode{\leavevmode}{}%
3640 \unskip(\ignorespaces#1\unskip)\quad
3641 }%
3642 }%

```

`\frontmatter@abstractheading` Space above 21.8bp b-b.

```

3643 \def\frontmatter@abstractheading{%
3644 \preprintsty@sw{%
3645 \begingroup
3646 \centering\large
3647 \abstractname
3648 \par
3649 \endgroup
3650 \vspace{.5pc}%
3651 }{}%
3652 }%

```

`\frontmatter@abstractfont` TimesTen 8.93bp/9.6bp X 360bp, indented 36bp, with 21.9/37.6bp b-b above/below

```

3653 \def\frontmatter@abstractfont{%
3654 \footnotesize
3655 \hsize360\p@
3656 \leftskip=0.5in
3657 \advance\hsize\leftskip
3658 %\rightskip=\leftskip
3659 \parindent\z@
3660 %\hsize5.5in
3661 }%

```

`\frontmatter@preabstractspace` Space above and space below abstract in title block. Should be 22/36 points

`\frontmatter@postabstractspace` base-to-base.

```

3662 \def\frontmatter@preabstractspace{7.7\p@}%
3663 \def\frontmatter@postabstractspace{24.6\p@}%

```

FIXME: Not done: PACS. FIXME: TOC: Head is same as

30 :

HelveticaNeue 8.98. 32/22bp b-b above/below, Body: TimesTen 8/10.5.

30.1 General Text

If not in preprint mode, set the type size to 10/12 point. Note: s/b 11.6bp leading

```
3664 \appdef\set@typesize@hook{%
3665   \@ifxundefined\preprintsty@sw}{}%
3666   \preprintsty@sw}{}%
3667   \def\normalsize{%
3668     \@setsize\normalsize{12pt}\xpt\xpt
3669     \abovedisplayskip 10\p@ plus2\p@ minus5\p@
3670     \belowdisplayskip \abovedisplayskip
3671     \abovedisplayshortskip \abovedisplayskip
3672     \belowdisplayshortskip \abovedisplayskip
3673     \let\@listi\@listI
3674   }%
3675 }%
3676 }%
3677 }%
```

Footnote mods:

```
3678 \footnotesep 9.25pt
3679 \skip\footins 36pt plus 4pt minus 2pt
3680 \def\footnoterule{\kern-13pt\hrule width.5in\kern15.6pt\relax}%
```

30.2 Sectioning

```
3681 \def\thepart{\Roman{part}} %
3682 \def\thesection{\Roman{section}}
3683 \def\p@section{}
3684 \def\thesubsection{\Alph{subsection}}
3685 \def\p@subsection{\thesection.}
3686 \def\thesubsubsection{\arabic{subsubsection}}
3687 \def\p@subsubsection{\thesection.\thesubsection.}
3688 \def\theparagraph{\alph{paragraph}}
3689 \def\p@paragraph{\thesection.\thesubsection.\thesubsubsection.}
3690 \def\thesubparagraph{\arabic{subparagraph}}
3691 \def\p@subparagraph{\thesection.\thesubsection.\thesubsubsection.\theparagraph.}
```

In RMP, put a period (.), followed by nut space, after the section number.

Also, hang the section number (the L^AT_EX default).

```
3692 \def@secntformat#1{\csname the#1\endcsname.\hskip0.5em\relax}%
```

Note that we wish to set the section head uppercase, so we use David Carlisle's `\MakeTextUppercase`. However, because this procedure effectively parses its ar-

gument (looking for things to *not* translate), it has to be invoked in such a way that the argument of the `\section` command is passed to it as its own argument.

To accomplish this, we use the `\@hangfrom@` hook, which was developed for this purpose.

```

3693 \def\section{%
3694 \@startsection{section}{1}{\z@}{0.8cm plus1ex minus.2ex}{0.4cm}%
3695 {%
3696 \small\sffamily\bfseries\selectfont
3697 \raggedright
3698 \parindent\z@
3699 }%
3700 }%
3701 \def\@hangfrom@section#1#2#3{\@hangfrom{#1#2}\MakeTextUppercase{#3}}%
3702 \def\subsection{%
3703 \@startsection{subsection}{2}{\z@}{0.8cm plus1ex minus.2ex}{0.4cm}%
3704 {%
3705 \small\sffamily\bfseries
3706 \raggedright
3707 \parindent\z@
3708 }%
3709 }%
3710 \def\subsubsection{%
3711 \@startsection{subsubsection}{3}{\z@}{.8cm plus1ex minus.2ex}{0.4cm}%
3712 {%
3713 \small\sffamily\selectfont
3714 \raggedright
3715 \parindent\z@
3716 }%
3717 }%
3718 \def\paragraph{%
3719 \@startsection{paragraph}{4}{\z@}{.8cm plus1ex minus.2ex}{-1em}%
3720 {%
3721 \small\slshape\selectfont
3722 \raggedright
3723 \parindent\z@
3724 }%
3725 }%
3726 \def\subparagraph{%
3727 \@startsection{subparagraph}{4}{\parindent}{3.25ex plus1ex minus.2ex}{-1em}%
3728 {\normalsize\bfseries\selectfont}%
3729 }%
3730 %
3731 \setcounter{tocdepth}{4}% FIXME: has no effect

\appendix
\@hangfrom@appendix 3732 \appdef\appendix{%
\@hangfroms@appendix 3733 \let\@hangfrom@section\@hangfrom@appendix
\@appendixcntformat 3734 \let\@hangfroms@section\@hangfroms@appendix
3735 \let\@sectioncntformat\@appendixcntformat
3736 }%

```

```

3737 \def\@hangfrom@appendix#1#2#3{%
3738 #1%
3739 \@ifempty{#2}{%
3740 #3%
3741 }{%
3742 #2\@ifempty{#3}{\ #3}%
3743 }%
3744 }%
3745 \def\@hangfroms@appendix#1#2{%
3746 #1\appendixname\@ifempty{#2}{\ #2}%
3747 }%
3748 \def\@appendixcntformat#1{\appendixname \ \csname the#1\endcsname}%

```

30.3 Figure and Table Caption Formatting

`\@makecaption`

```

3749 \setlength\belowcaptionskip{2\p@}
3750 \long\def\@makecaption#1#2{%
3751 \vskip\abovecaptionskip
3752 \vbox{%
3753 \flushing
3754 \small\rmfamily
3755 % \hsize\@capwidth
3756 \noindent
3757 #1\nobreak\hskip.5em plus.2em\ignorespaces#2\par
3758 }%
3759 \vskip\belowcaptionskip
3760 }%

```

30.4 Citations and Bibliography

Customize REV_T_EX for the journal substyle; this task requires three components: a BIB_T_EX .bst style file, customizing code for natbib, and customizations of the thebibliography environment.

`\@bibstyle` Define the argument of the `\bibliographystyle` command (if the document does not do so).

The user must have installed a .bst file of the corresponding name. This file will then be used by BIB_T_EX when compiling the document's .bb1 file.

To generate apsrmp.bst, use custom-bib version 3.89d1 or later. Run the .bst generator, makebst.tex, with the following options:

1. STYLE OF CITATIONS: a: ay(Author-year with some non-standard interface)
2. AUTHOR-YEAR SUPPORT SYSTEM: nat: (Natbib for use with natbib v5.3 or later)
3. ORDERING OF REFERENCES: *: (Alphabetical);

4. ORDER ON VON PART: x: vonx (Sort without von part—de la Maire after Mahone)
5. AUTHOR NAMES: a: nm-rev1 (Only first name reversed, initials—AGU style: Smith, J. F., H. K. Jones)
6. POSITION OF JUNIOR: jr1st (Junior comes last as Smith, John, Jr.)
7. NUMBER OF AUTHORS: l: max 12, min 12 (three prompts in all);
8. TYPEFACE FOR AUTHORS IN LIST OF REFERENCES: u: nmft, nmft-def (User defined author font—`\bibnamefont`)
9. FONT FOR FIRST NAMES: u: fnm-def (First names in user defined font—`\bibfnamefont`)
10. EDITOR NAMES IN INCOLLECTION ETC: a: nmfted (Editors in collection like authors font)
11. FONT FOR ‘AND’ IN LIST: r: nmand-rm (‘And’ in normal font—JONES and JAMES)
12. FONT OF CITATION LABELS IN TEXT: u: lab, lab-def (User-defined citation font—`\citenamefont`)
13. LABEL WHEN AUTHORS MISSING: keyxyr (Year blank when KEY replaces missing author—for natbib 7.0)
14. DATE POSITION: b: dt-beg (Date after authors)
15. SUPPRESS MONTH: xmth (Date is year only)
16. DATE FORMAT: yr-com (Date preceded by comma as ‘, 1993’)
17. TRUNCATE YEAR: note-yr (Year text full as 1990–1993 or ‘in press’)
18. ARTICLE TITLE PRESENT: x: jt1t-x (No article title);
19. JOURNAL TITLE FONT: r: jt1t-rm (Journal title normal);
20. TECHNICAL REPORT TITLE: b: trt1t-b (Tech. report title like books);
21. JOURNAL VOLUME: b: vol-bf (Volume bold);
22. VOLUME PUNCTUATION: c: volp-com (Volume with comma);
23. PAGE NUMBERS: f: jpg-1 (Only start page number);
24. POSITION OF PAGES: e: pp-last (Pages at end, but before any notes)
25. NUMBER AND SERIES FOR COLLECTIONS: num-xser (Allows number without series and suppresses word “number”)

26. JOURNAL NAME PUNCTUATION: x: jnm-x (Space after journal);
27. PUBLISHER IN PARENTHESES: p: pub-par (Publisher in parentheses)
28. PUBLISHER POSITION: p: pre-pub (Publisher before chapter, pages);
29. ISBN NUMBER: *: isbn (Include ISBN);
30. ISSN NUMBER: *: isbn (Include ISSN for periodicals);
31. 'EDITOR' AFTER NAMES: a: edpar ('Name (editor),' in parentheses, after name, comma after)
32. EDITOR IN COLLECTIONS: b: edby (In booktitle, edited by...—where ... is names)
33. PUNCTUATION BETWEEN SECTIONS (BLOCKS): c: blk-com (Comma between blocks);
34. 'IN' WITH JOURNAL NAMES: i: injnl (Add 'in' before journal name in style for incollection)
35. ABBREVIATE WORD 'PAGES': a: pp ('Page' abbreviated);
36. ABBREVIATE WORD 'EDITORS': a: ed ('Editor' abbreviated);
37. ABBREVIATION FOR 'EDITION': a: ednx ('Edition' abbreviated as 'ed');
38. EDITION NUMBERS: xedn (Editions as in database saving much processing memory)
39. STORED JOURNAL NAMES: a: jabr (Abbreviated journal names);
40. FONT OF 'ET AL': i: etal-it (Italic et al);
41. ADDITIONAL REVTeX DATA FIELDS: r: revdata, eprint, url, url-blk (Include REVTeX data fields)
42. NEW FONT SELECTION SCHEME: n: nfss (NFSS);
43. ADDITIONAL REVTeX DATA FIELDS: y: revdata (additional data fields);
44. REFERENCE COMPONENT TAGS: r: bibinfo (reference component tags);

A file `apsrmp.dbj` file equivalent to the following should result:

```
% \input docstrip
% \preamble
% -----
% *** REVTeX-compatible apsrmp.bst ***
% \endpreamble
% \postamble
```

```

% End of customized bst file
% \endpostamble
% \keepsilent
% \askforoverwritefalse
% \def\MBopts{\from{merlin.mbs}{%
%   ay%: Author-year with some non-standard interface
%   ,nat%: Natbib for use with natbib v5.3 or later
%   ,vonx%: Sort without von part (de la Maire after Mahone)
%   ,nm-rev1%: Only first name reversed, initials (AGU style: Smith, J. F., H. K. Jones)
%   ,jnrlst%: Junior comes last as Smith, John, Jr.
%   ,nmlm%: Limited authors (et al replaces missing names)
%     ,x10%: Maximum of 10 authors
%     ,m10%: Minimum of 10 authors
%   ,nmft,nmft-def%: User defined author font (\bibnamefont)
%   ,fnm-def%: First names in user defined font (\bibfnamefont)
%   ,nmfted%: Editors incollection like authors font
%   ,nmand-rm%: 'And' in normal font (JONES and JAMES)
%   ,lab,lab-def%: User defined citation font (\citenamefont)
%   ,keyxyr%: Year blank when KEY replaces missing author (for natbib 7.0)
%   ,dt-beg%: Date after authors
%   ,xmth%: Date is year only
%   ,yr-com%: Date preceded by comma as ', 1993'
%   ,note-yr%: Year text full as 1990--1993 or 'in press'
%   ,jtit-x%: No article title
%   ,jttil-rm%: Journal name normal font
%   ,trtit-b%: Tech. report title like books
%   ,vol-bf%: Volume bold as {\bf vol}(num)
%   ,volp-com%: Volume with comma as vol(num), ppp
%   ,jpg-1%: Only start page number
%   ,pp-last%: Pages at end but before any notes
%   ,num-xser%: Allows number without series and suppresses word "number"
%   ,jnm-x%: Space after journal name
%   ,pub-par%: Publisher in parentheses
%   ,pre-pub%: Publisher before chapter, pages
%   ,isbn%: Include ISBN for books, booklets, etc.
%   ,issn%: Include ISSN for periodicals
%   ,edpar%: 'Name (editor),' in parentheses, after name, comma after
%   ,edby%: In booktitle, edited by .. (where .. is names)
%   ,blk-com%: Comma between blocks
%   ,injnl%: Add 'in' before journal name in style for incollection
%   ,pp%: 'Page' abbreviated as p. or pp.
%   ,ed%: 'Editor' abbreviated as ed. or eds.
%   ,xedn%: Editions as in database saving much processing memory
%   ,jabr%: Abbreviated journal names
%   ,etal-it%: Italic et al
%   ,revdata,eprint,url,url-blk%: Include REVTeX data fields collaboration, eid, eprint, numpages
%   ,bibinfo%: Reference component tags like \bibinfo in the content of \bibitem
%   ,nfss%: NFSS use \textbf, \emph, not \bf, \em
%   }}
% \generate{\file{\jobname.bst}{\MBopts}}

```

```

% \endbatchfile
%

3761 \appdef\class@documenthook{%
3762 \@ifxundefined\@bibstyle{%
3763   \def\@bibstyle{apsrmp}%
3764 }{%
3765 }%

\bigpunct The following commands effectively establish the style in which \cite commands
are formatted. You can think of them as the second needed component for the
bibliography.
    Set up for author-year citations: when \NAT@set@cites executes (at \begin{document}
time), the \@biblabel will be set to \NAT@biblabel.
    Per Karie Friedman (friedman@phys.washington.edu), multiple citations are
separated by semicolons, e.g., (Jones, 1999; Abbott and Smith, 2000; Wortley,
2001a), and multiple citations by the same author by commas, e.g., Abela et al.
(1995, 1997a, 1997b). The third argument of \bigpunct handles the former.
    The fifth argument puts a comma after the author when the year is not in
parens: (Lee et al., 1996).
3766 \bigpunct{({})}{;}{a}{,}{,}{,}%

\cite Per Mark Doyle, \cite is mapped to \citep in RMP.
3767 \let\cite\citep

\bigsection We define the sectioning command to use when starting the bibliography.
\bigpreamble 3768 \def\bigsection{%
\newblock 3769 \let\@hangfroms@section\@hang@froms
\bighang 3770 \section*{\refname}%
\bigsep 3771 \@nobreaktrue
3772 }%
3773 \let\bigpreamble\@empty
3774 \def\newblock{\ }%
3775 \bighang10\p@
3776 \bigsep\z@

\footinbib@sw Footnotes in bibliography are inconsistent with author-year references, and are
particularly nast under natbib: the package will automatically change to num-
bered references if any \bibitem commands lack the optional argument. There-
fore, we must uninvoke it now, even if invoked by the document.
3777 \@ifxundefined\footinbib@sw{%
3778 \footinbib@sw%
3779 \class@warn%
3780 Footnotes in bibliography are incompatible with RMP.^^J%
3781 Undoing the footinbib option.
3782 }%
3783 }{%
3784 }%
3785 \@booleanfalse\footinbib@sw

```

`\eprint` RMP requires the `\eprint` field in the bib entry to be set off with the word “eprint”.

```
3786 \def\eprint#1{eprint #1}%
```

30.5 Table of Contents

We set up for auto-sizing of certain TOC elements.

To do this, we override certain definitions for the default TOC font (`\toc@font`) and spacing (`dotsep`), and define formatting for the needed elements (`\l@...`). Finally, we activate the autosizing by assigning `\toc@pre` and `\toc@post`.

`\toc@font` Set the formatting characteristics of the auto-indenting part of the TOC.

```
3787 \def\toc@font{%
3788   \footnotesize\rmfamily
3789   \def\{\space\ignorespaces}%
3790 }%
3791 \def\dotsep{5.5pt}%
```

`\l@section` Determine which TOC elements are automatically indented.

```
3792 \def\tocleft@{\z@}%
3793 \def\tocdim@min{5\p@}%
3794 \def\l@section{%
3795   \l@sections{}{section}% Implicit #3#4
3796 }%
3797 \def\l@subsection{%
3798   \l@sections{section}{subsection}% Implicit #3#4
3799 }%
3800 \def\l@subsubsection{%
3801   \l@sections{subsection}{subsubsection}% Implicit #3#4
3802 }%
3803 %\def\l@subsubsection#1#2{%
3804 \def\l@paragraph#1#2{%
3805 \def\l@subparagraph#1#2{%
```

Activate the TOC processing.

```
3806 \let\toc@pre\toc@pre@auto
3807 \let\toc@post\toc@post@auto
3808 %</rmp>
```

Here ends the programmer’s documentation.

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