

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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*First revision by David Carlisle

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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
hyperref	hyperref
amsmath	amsmath
amssymb	amssymb
aps	overcite

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 `amsmath` 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 `hyperref`, `amsmath`, `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.

FIXME: per SPQR, `hyperref` to load last of all.

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
7This file is part of the APS files in the REVTeX 4 distribution.
8For 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:revtex4@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{revtex4.dtx}{class-pst}%
28   }%
29   \file{aps.rtx}{\from{revtex4.dtx}{aps}}%
30   \file{rmp.rtx}{\from{revtex4.dtx}{rmp}}%
31   \file{10pt.rtx}{\from{revtex4.dtx}{10pt}}%
32   \file{11pt.rtx}{\from{revtex4.dtx}{11pt}}%
33   \file{12pt.rtx}{\from{revtex4.dtx}{12pt}}%
34   \file{revsymb.sty}{\from{revtex4.dtx}{revsymb}}%
35 }%
36 \endbatchfile
37 %</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 REV \TeX 3.1. However, the new scheme does differ from the old in that the `.rtx` file should define no syntactical extensions to REV \TeX .

5 The `revtex4` Document Class

```
38 %<class-pre>
39 \def\class@name{revtex4}%
```

5.1 Compatibility Processing

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

```
40 \if@compatibility
41   \edef\reserved@a{\errhelp{%
42     Change your \string\documentstyle\space statement to
43     \string\documentclass\space and rerun.
44   }}\reserved@a
45   \errmessage{You cannot run \class@name\space in compatibility mode}%
46   \expandafter\@@end
47 \fi
```

6 Extensions to the \LaTeX Kernel

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

We load the utility and page grid packages:

```
48 %</class-pre>
49 %\RequirePackage{ltxutil}%
50 %\RequirePackage{ltxgrid}%
51 %<class-pst>
```

Try to patch `longtable`.

```
52 \appdef\class@documenthook{%
53   \switch@longtable
54 }%
```

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.

```
55\appdef\class@documenthook{%
56 \class@inithook
57 }%
58\def\class@inithook{%
59 %
```

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

```
60\appdef\class@inithook{%
61 \@ifxundefined\twocolumn@sw{\@booleanfalse\twocolumn@sw}{}%
62 }%
```

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

```
63\appdef\class@inithook{%
64 \@ifxundefined\footinbib@sw{\@booleanfalse\footinbib@sw}{}%
65 }%
```

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

```
66\appdef\class@inithook{%
67 \@ifxundefined\preprintsty@sw{\@booleanfalse\preprintsty@sw}{}%
68 }%
```

`\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.

```
69\appdef\class@inithook{%
70 \@ifxundefined\preprint@sw{\@booleantrue\preprint@sw}{}%
71 }%
```

`\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.

```

72 \appdef\class@inithook{%
73 \@ifxundefined\galley@sw{\@booleanfalse\galley@sw}{}%
74 }%

```

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

`\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 not.

```

75 \appdef\class@inithook{%
76 \@ifxundefined\showPACS@sw{\@booleanfalse\showPACS@sw}{}%
77 }%

```

`\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. The default is established here.

`\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`.

```

78 \appdef\class@inithook{%
79 \@ifxundefined\twoside@sw{\@booleanfalse\twoside@sw}{}%
80 \twoside@sw{\@twosidetrue}{\@twosidefalse}%
81 }%

```

`\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.

```

82 \appdef\class@inithook{%
83 \@ifxundefined\draft@sw{\@booleanfalse\draft@sw}{}%
84 \draft@sw{\overfullrule 5\p@}{\overfullrule\z@}%
85 }%

```

`\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.

```

86 \appdef\class@inithook{%
87 \@ifxundefined\tightenlines@sw{\@booleanfalse\tightenlines@sw}{}%
88 }%

```

`\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.

```

89 \appdef\class@inithook{%
90 \@ifxundefined\lengthcheck@sw{\@booleanfalse\lengthcheck@sw}{}%
91 }%

```

`\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.

```

92 \appdef\class@inithook{%
93 \@ifxundefined\eqsecnum@sw{\@booleanfalse\eqsecnum@sw}{}%
94 \eqsecnum@sw{%
95 \@addtoreset{equation}{section}%
96 \def\theequation@prefix{\thesection.}%
97 }{}%
98 }%

```

`\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.

```

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

```

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.

```

102 \DeclareOption{checkin}{%
103 \@booleantrue\dateinRH@sw
104 \@booleantrue\preprintsty@sw
105 \def\@pointsize{12}%
106 \@booleantrue\showPACS@sw
107 }%
108 \@booleanfalse\dateinRH@sw
109 \def\checkindate{\dateinRH@sw{\tiny(\today)}}{}%

```

7.2.2 Preprint Style

```

110 \DeclareOption{preprint}{%
111 \@booleantrue\preprintsty@sw
112 \def\@pointsize{12}%

```

```

113 }%
114 \DeclareOption{manuscript}{%
115 \class@warn{Document class option manuscript is obsolete; use preprint instead}%
116 \ExecuteOptions{preprint}%
117 }%

```

7.2.3 Showing PACS

```

118 \DeclareOption{showpacs}{%
119 \booleantrue\showPACS@sw
120 }%
121 \DeclareOption{noshowpacs}{%
122 \booleanfalse\showPACS@sw
123 }%

```

7.2.4 Showing preprint numbers

```

124 \DeclareOption{nopreprintnumbers}{%
125 \booleanfalse\preprint@sw
126 }%

```

7.2.5 Hypertext Option

DPC: For Hyperpreprint, we want to load hyperref, but stop it making special kludges for revtex3 which don't apply here. (Once REVTeX 4 is released, hyperref can be updated to spot the difference between revtex3 and 4, but this will not do any harm, even then.)
 FIXME: hyperref should load last of all packages.

```

127 \DeclareOption{hyperref}{%
128 \AtEndOfClass{%
129 \begingroup
130 \edef\@tempa{%
131 \let
132 \noexpand\@clsextension
133 \noexpand\@empty
134 \noexpand\RequirePackage{hyperref}%
135 \def\noexpand
136 \@clsextension{\@clsextension}%
137 }%
138 \expandafter
139 \endgroup
140 \@tempa
141 }%

```

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.

```

142 \def\@pointsize{10}%
143 }%

```

7.2.6 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.

```
144 \DeclareOption{10pt}{\def\@pointsize{10}}
145 \DeclareOption{11pt}{\def\@pointsize{11}}
146 \DeclareOption{12pt}{\def\@pointsize{12}}
```

7.2.7 Media Size

```
147 \DeclareOption{a4paper}
148   {\setlength\paperheight {297mm}%
149    \setlength\paperwidth  {210mm}}
150 \DeclareOption{a5paper}
151   {\setlength\paperheight {210mm}%
152    \setlength\paperwidth  {148mm}}
153 \DeclareOption{b5paper}
154   {\setlength\paperheight {250mm}%
155    \setlength\paperwidth  {176mm}}
156 \DeclareOption{letterpaper}
157   {\setlength\paperheight {11in}%
158    \setlength\paperwidth  {8.5in}}
159 \DeclareOption{legalpaper}
160   {\setlength\paperheight {14in}%
161    \setlength\paperwidth  {8.5in}}
162 \DeclareOption{executivepaper}
163   {\setlength\paperheight {10.5in}%
164    \setlength\paperwidth  {7.25in}}
165 \DeclareOption{landscape}
166   {\setlength\@tempdima  {\paperheight}%
167    \setlength\paperheight {\paperwidth}%
168    \setlength\paperwidth  {\@tempdima}}
```

7.2.8 Bibnotes

The default for `\author@note` (email, homepage) is a `\footnote`, the alternative, selected by this option, is a `bibnote`.

```
169 \DeclareOption{bibnotes}{\@booleantrue\bibnotes@sw}%
170 \DeclareOption{nobibnotes}{\@booleanfalse\bibnotes@sw}%
171 \appdef\class@inithook{%
172   \@ifxundefined\bibnotes@sw{\@booleanfalse\bibnotes@sw}{}%
173   \bibnotes@sw{%
174     \let\author@note\rtx@bibnote
175     \appdef\class@endpagegridhook{\auto@bib}%
176   }{%
177     \let\author@note\footnote
178   }%
179 }
```

7.2.9 Footinbib

```
180 \DeclareOption{footinbib}{\@booleantrue\footinbib@sw}
181 \DeclareOption{nofootinbib}{\@booleanfalse\footinbib@sw}
```

7.2.10 superbib

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

```
182 \DeclareOption{superbib}{%
183 \def\place@bibnumber{\place@bibnumber@sup}%
184 }%
```

7.2.11 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?

```
185 \DeclareOption{twoside}{\@booleantrue\twoside@sw \mparswitchfalse}
186 \DeclareOption{oneside}{\@booleanfalse\twoside@sw \mparswitchtrue}
```

7.2.12 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 `\AtBeginDocument` 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 `\newifswitch\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`.)

```
187 \def\class@endpagegridhook{\par}%
188 \AtEndOfClass{%
189 \appdef\class@enddocumenthook{%
190 \class@endpagegridhook
191 \close@column
192 }%
193 \appdef\class@inithook{%
194 \@ifundefined\close@column{%
195 \let\close@column\close@column@default
196 }{}%
197 }%
198 }%
```

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

```
199 \DeclareOption{twocolumn}{%
200   \@booleantrue\twocolumn@sw
201 }%
```

onecolumn specifies one-column page grid.

```
202 \DeclareOption{onecolumn}{%
203   \@booleanfalse\twocolumn@sw
204 }%
```

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.

```
205 \DeclareOption{galley}{%
206   \ExecuteOptions{onecolumn}%
207   \@booleantrue\galley@sw
208   \appdef\set@pica@hook{%
209     \advance\textwidth-\columnsep
210     \textwidth.5\textwidth
211   }%
212 }%
```

7.2.13 tightenlines

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

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

7.2.14 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.

```
214 \DeclareOption{lengthcheck}{\@booleantrue\lengthcheck@sw}
```

7.2.15 Draft and Final

```
215 \DeclareOption{draft}{%
216   \@booleantrue\draft@sw
217 }%
218 \DeclareOption{final}{%
219   \@booleanfalse\draft@sw
220 }%
```

7.2.16 eqsecnum

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

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


7.2.17 secnumarabic

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

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

The code that polls the Boolean `\secnumarabic@sw` appears in Section 23.2.

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

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

7.2.18 floats/endfloats

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

```
224 \DeclareOption{floats}{\@booleantrue\floats@sw\@booleanfalse\floatp@sw}
225 \DeclareOption{endfloats}{\@booleanfalse\floats@sw\@booleanfalse\floatp@sw}
226 \DeclareOption{endfloats*}{\@booleanfalse\floats@sw\@booleantrue\floatp@sw}
227 \appdef\class@inithook{%
228   \@ifxundefined\floats@sw{\@booleantrue\floats@sw}{}%
229   \@ifxundefined\floatp@sw{\@booleantrue\floatp@sw}{}%
230 }%
```

7.2.19 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.

```
231 \DeclareOption{titlepage}{\@booleantrue\titlepage@sw}
232 \DeclareOption{notitlepage}{\@booleanfalse\titlepage@sw}
233 \appdef\defaults@hook{%
234   \@ifxundefined\titlepage@sw{\@booleanfalse\titlepage@sw}{}%
235 }%
```

7.2.20 Substyle and Sub-substyle

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

```
236 \def\change@society#1{%
237   \def\@tempa{#1}%
238   \@ifxundefined\@society{}{%
239     \@ifx{\@tempa\@society}{}{%
```

```

240 \class@warn{Conflicting society \@tempa<>\@society.}%
241 }%
242 }%
243 \let\@society\@tempa
244 }%
245 \DeclareOption{aps}{\change@society{aps}\def\@journal{}}%
246 \DeclareOption{pra}{\change@society{aps}\def\@journal{pra}}%
247 \DeclareOption{prb}{\change@society{aps}\def\@journal{prb}}%
248 \DeclareOption{prc}{\change@society{aps}\def\@journal{prc}}%
249 \DeclareOption{prd}{\change@society{aps}\def\@journal{prd}}%
250 \DeclareOption{pre}{\change@society{aps}\def\@journal{pre}}%
251 \DeclareOption{prl}{\change@society{aps}\def\@journal{prl}}%
252 \DeclareOption{prstab}{\change@society{aps}\def\@journal{prstab}}%
253 \DeclareOption{rmp}{\change@society{aps}\def\@journal{rmp}}%

```

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.

```

254 \DeclareOption{amsfonts}{%
255 \def\class@amsfonts{\RequirePackage{amsfonts}}%
256 }%
257 \DeclareOption{noamsfonts}{%
258 \let\class@amsfonts\@empty
259 }%
260 \AtEndOfClass{%
261 \@ifxundefined\class@amsfonts{\class@amsfonts}%
262 }%

```

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

```

263 \DeclareOption{amssymb}{%
264 \def\class@amssymb{\RequirePackage{amssymb}}%
265 }%
266 \DeclareOption{noamssymb}{%
267 \let\class@amssymb\@empty
268 }%
269 \AtEndOfClass{%
270 \@ifxundefined\class@amssymb{\class@amssymb}%
271 }%

```

7.2.21 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 op-

tions, we carry out our action at `\AtBeginDocument` time, and only if none of the related class options were invoked.

```
272 \DeclareOption{groupedaddress}{\clo@groupedaddress}%
273 \def\clo@groupedaddress{%
274   \@booleantrue\groupauthors@sw
275   \@booleantrue\@affils@sw
276   \@booleanfalse\runinaddress@sw
277 }%
278 \appdef\class@inithook{%
279   \@ifxundefined\groupauthors@sw{\clo@groupedaddress}{}%
280 }%
```

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

```
281 \DeclareOption{unsortedaddress}{\clo@unsortedaddress}%
282 \def\clo@unsortedaddress{%
283   \@booleantrue\groupauthors@sw
284   \@booleanfalse\@affils@sw
285   \@booleanfalse\runinaddress@sw
286 }%
```

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

```
287 \DeclareOption{runinaddress}{\clo@runinaddress}%
288 \def\clo@runinaddress{%
289   \@booleantrue\groupauthors@sw
290   \@booleantrue\@affils@sw
291   \@booleantrue\runinaddress@sw
292 }%
```

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

```
293 \DeclareOption{superscriptaddress}{\clo@superscriptaddress}%
294 \def\clo@superscriptaddress{%
295   \@booleanfalse\groupauthors@sw
296   \@booleantrue\@affils@sw
297   \@booleanfalse\runinaddress@sw
298 }%
```

7.2.22 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.

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

7.3 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 L^AT_EX 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.

```
300 \DeclareOption*{%
301 \IfFileExists{\CurrentOption\substyle@ext}{%
302 \expandafter\change@society\expandafter{\CurrentOption}%
303 }{%
304 \OptionNotUsed
305 }%
306 }%
307 \def\substyle@ext{.rtx}%
308 \AtEndOfClass{%
309 \@ifxundefined@society{%
310 \class@warn{No Society specified, using generic APS style}%
311 \def@society{aps}\def@journal{}%
312 }{}%
313 \expandafter\input\expandafter{\@society\substyle@ext}%
314 }%
```

7.4 Class-Asserted Options

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

```
315 \ExecuteOptions{10pt}
```

7.5 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.

```
316 \ProcessOptions\relax
```

8 Procedures Dependent Upon Options

```
\ps@headings
\ps@myheadings 317 \def\ps@headings@twoside{%
318 \let\mkboth\markboth
```

```

319 \let\@oddfoot\@empty
320 \let\@evenfoot\@empty
321 \def\@evenhead{\thepage\quad\checkindate\hfil \slshape \leftmark}%
322 \def\@oddhead{\slshape \rightmark}\hfil\checkindate\quad\thepage}%
323 \def\sectionmark##1{%
324   \markboth{%
325     \MakeTextUppercase{%
326       \@ifnum{\c@secnumdepth >\z@}{\thesection\hskip 1em\relax}}{%
327       ##1%
328     }%
329   }{}%
330 }%
331 \def\subsectionmark##1{%
332   \markright {%
333     \@ifnum{\c@secnumdepth >\@ne}{\thesubsection\hskip 1em\relax}}{%
334     ##1%
335   }%
336 }%
337 }%
338 \def\ps@headings@oneside{%
339   \let\mkboth\markboth
340   \let\@oddfoot\@empty
341   \let\@evenfoot\@empty
342   \def\@oddhead{\slshape \rightmark}\hfil\checkindate\quad\thepage}%
343   \def\sectionmark##1{%
344     \markright {%
345       \MakeTextUppercase{%
346         \@ifnum{\c@secnumdepth >\z@}{\thesection\hskip 1em\relax}}{%
347         ##1%
348       }%
349     }%
350   }%
351 }%
352 \def\ps@footer{%
353   \let\mkboth\markboth
354   \def\@oddfoot{\hb@xt@\z@{\checkindate\hss}\hfil\thepage\hfil}%
355   \def\@evenfoot{\hfil\thepage\hfil\hb@xt@\z@{\hss\checkindate}}%
356   \def\@oddhead{}%
357   \def\@evenhead{}%
358   \def\sectionmark##1{}%
359 }%
360 \appdef\class@inithook{%
361   \twoside@sw{%
362     \let\ps@headings\ps@headings@twoside
363   }{}%
364   \let\ps@headings\ps@headings@oneside
365 }%
366 }%
367 \def\ps@myheadings{%

```

```

368 \let\mkboth@gobbletwo
369 \def\@oddhead{\slshape\rightmark}\hfil\checkindate\quad\thepage}%
370 \let\@oddfoot\@empty
371 \def\@evenhead{\thepage\quad\checkindate\hfil\slshape\leftmark}%
372 \let\@evenfoot\@empty
373 \let\sectionmark@gobble
374 \let\subsectionmark@gobble
375 }%

376 \def\ps@article{%
377 \def\@evenhead{\thepage\quad\checkindate\hfil{\leftmark}}%
378 \def\@oddhead{\rightmark}\hfil\checkindate\quad\thepage}%
379 \def\@oddfoot{}%
380 \let\@evenfoot\@oddfoot
381 \let\mkboth@gobbletwo
382 \let\sectionmark@gobble
383 \let\subsectionmark@gobble
384 }%

```

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

```

385 \def\lastpage@putlabel{%
386 \if@filesw
387 \begingroup
388 \advance\c@page\m@ne
389 \immediate\write\@auxout{\string\newlabel{LastPage}{\thepage}}%
390 \endgroup
391 \fi
392 }%

```

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`?

```

393 \AtEndOfClass{%
394 \appdef\class@enddocumenthook{%
395 \clearpage
396 \lastpage@putlabel
397 \let\clearpage\relax
398 }%
399 }%

```

9 Required Packages

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

```
400 \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.

```
401 \appdef\class@inithook{%  
402 \incompatible@package{cite}%  
403 \incompatible@package{multicol}%  
404 }%
```

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>\@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>\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>\author@note</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.

```

405 \renewcommand\title{\@dblarg\do@title}%
406 \def\do@title[#1]#2{%
407   \def\@title{#2}%
408   \def\@shorttitle{#1}%
409 }%
```

`\@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`.

```

410 \def\@title{\class@warn{No title}}%
411 \def\@shorttitle{}%
```


12.2 The author command and related commands

- `\c@affil` A counter to store the affiliation numbers used for the superscript marks. This command defines `\theaffil`.
- ```
412 \newcounter{affil}
```
- `\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 `\and` command for putting multiple authors in one `\author` command. `\and` is not supported in this class.
- This procedure moves the previous author to the list for the current address (`\move@author`) and starts a new author name with a flag value indicating that an `\author` with no affiliation has been specified (a following `\affiliation` command will reset this, i.e., `\@author@sw`).
- ```
413 \renewcommand\author[1]{%
414   \@author@sw{%
415     \addaffils
416   }{}%
417   \move@author
418   \def\@author{{}{}{#1}}{}%
419   \let\thanks\thanks@author
420 }%
```
- `\move@author` 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 `\@collaboration@opr` intercollated operator, otherwise we apply `\@author@opr`.
- ```
421 \def\move@author{%
422 \@author@sw{}{}%
423 \collaboration@sw{%
424 \@booleanfalse\collaboration@sw
425 \expandafter\appdef
426 \expandafter\@authors@curr
427 \expandafter{%
428 \expandafter \@collaboration@opr
429 \@author
430 }%
431 }{}%
432 \expandafter\appdef
433 \expandafter\@authors@curr
434 \expandafter{%
435 \expandafter \@author@opr
436 \@author
437 }%
438 }%
439 }%
440 }%
```
- `\collaboration` Specify the collaboration (given after a group of authors).



```

481 \def\@author@join@ii#1#2#3#4#5{%
482 \def\@author{#1}{\@join{\@separator}{#2}{#5}}{#3}{#4}}%
483 }%
484 \def\@author@join@iii#1#2#3#4#5{%
485 \def\@author{#1}{#2}{\@join{\@separator}{#3}{#5}}{#4}}%
486 }%
487 \def\@author@join@iv#1#2#3#4#5{%
488 \def\@author{#1}{#2}{#3}{\@join{\@separator}{#4}{#5}}}%
489 }%
490 \def\@author@finish{%
491 \@author@sw}{}%
492 \move@author
493 \begin@group
494 \let\href\@secondoftwo
495 \class@warn{No affiliation specified for \@author}%
496 \end@group
497 }%
498 \@addaffils
499 }%

```

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

```

500 \def\@join#1#2#3{%
501 \@ifempty{#2}{#3}{#2#1#3}%
502 }%
503 \def\@separator{; \space}%

```

`\surname` No-op to allow better post-processing of the file.  
`\firstname` 504 `\let\surname\@firstofone`  
 505 `\let\firstname\@firstofone`

`\@authors@curr` The control sequence name `\@authors@curr` accretes author entries (with `\@author@opr` as the intercollated operator) and collaboration entries (with `\@collaboration@opr` as the intercollated operator). Ultimately, its contents are appended to `\@authors`. It must be initialized to `\@empty`.

```
506 \let\@authors@curr\@empty
```

`\and` The original L<sup>A</sup>T<sub>E</sub>X 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`.

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

`\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 only print the affiliation once, but reuse the superscript marker.

```
508 \def\cat@comma@active{\catcode\,\active}%
509 {\cat@comma@active\gdef,{\active@comma}}%
```

```

510 \def\active@comma{,\penalty-300\relax}%
511 \newcommand*\affiliation[1][]{\begingroup\cat@comma@active\@affiliation{#1}}%
512 \def\@affiliation#1#2{%
513 \endgroup
514 \move@author\@author@init

```

Set the `\temp@sw` to true, then execute the affiliation list (`\@affil@list`) with the intercollated operator set to `\@affil@match`. 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 footnote. The Boolean `\@affils@sw` being false prevents this test from ever returning a positive result.

```

515 \@booleanfalse\temp@sw
516 \let\@tempd\@empty
517 \@affils@sw{%
518 \def\@tempa{#2}\let\@affil@opr\@affil@match\@affil@list
519 }}\temp@sw

```

True clause: This affiliation has been seen before. Check its footnote.

```

520 {%
521 \def\@tempa{#1}%
522 \@ifx{\@tempd\@tempa}{}{%
523 \class@warn{%
524 New footnote specified for \string\affiliation{#2}.
525 Please put it on the first instance thereof.
526 }%
527 }%
528 }%

```

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 `\@affil@list`.

```

529 {%
530 \stepcounter{affil}%
531 \edef\@tempc{\theaffil}%
532 \appdef \@affil@list{\@affil@opr}%
533 \appdef@eval\@affil@list\@tempc
534 \appdef \@affil@list{{#1}{#2}}%
535 }%

```

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

```

536 \appdef@eval\@affilID@curr\@tempc
537 }%

```

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

```

538 \newcommand\noaffiliation{%
539 \move@author\@author@init
540 \edef\@affilID@curr{\@affilID@curr}%
541 }%

```

`\@authors` The `\@authors` macro accretes authors (using `\@author@opr` as the intercollated operator), affiliations (using `\@affilID@opr` as the intercollated operator), and collaborations (using `\@collaboration@opr` as the intercollated operator).

DPC: It starts with `\relax` for the affiliation processing, and then `\@gobbletwo` which will eat the `\@andorcomma`, before the first name, so the first name does not get a comma before it.

```
542 \let\@authors\@empty
```

`\@addaffils` Append `\@authors@curr` and `\@affilID@curr` to `\@authors` and `\affils@list`, respectively.

```
543 \def\@addaffils{%
```

First, append current affiliation group (expansion of `\@affilID@curr`) to the author list (`\@authors`), using `\@affilID@opr` as the intercolated operator; also append the current authors (`\@authors@curr`).

```
544 \appdef \@authors{\@affilID@opr}%
```

```
545 \appdef@eval\@authors{\@affilID@curr}%
```

```
546 \appdef@e \@authors{\@authors@curr}%
```

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

```
547 \@booleanfalse\temp@sw
```

```
548 \let\affils@opr\affils@match\affils@list
```

```
549 \temp@sw}{}%
```

```
550 \appdef \affils@list{\affils@opr}%
```

```
551 \appdef@eval\affils@list{\@affilID@curr}%
```

```
552 }%
```

Finally, null out the temp registers.

```
553 \let\@authors@curr\@empty
```

```
554 \let\@affilID@curr\@empty
```

```
555 }%
```

`\affils@list` The macro `\affils@list` accretes `\@affilID@curr`, with `\affils@opr` as the intercolated operator. It must be empty at the beginning of the document.

```
556 \let\affils@list\@empty
```

`\@affil@list` The macro `\@affil@list` accretes the list of affiliations with `\@affil@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 `\@affil@opr` 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 `\@affil@opr` assumes the meaning of `\@affil@footnote`, `\@affil@match`, `\@affil@group`, or `\@affil@marked`, and the list `\@affil@list` is expanded.

```
557 \let\@affil@list\@empty
```

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

```
558 \let\@affilID@curr\@empty
```

`\@affil@match` The definition for the `\@affil@list` intercolated operator 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 first attribute of the matching entry and `\@tempd` will be the second attribute of the matching entry.

```
559 \def\@affil@match#1#2#3{%
560 \def\@tempb{#3}%
561 \@ifx{\@tempa\@tempb}{%
562 \@booleantrue\temp@sw
563 \def\@tempd{#2}%
564 \def\@tempc{#1}%
565 }{}%
566 }%
```

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

```
567 \def\@tempaffil@script#1#2{%
568 ,\,#1%
569 }%
```

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

```
570 \def\@tempaffil@group#1#2{%
571 \def\@tempc{#1}%
572 \def\@tempb{#2}%
573 \beginingroup
574 \let\@affil@opr\@affil@footnote\@affil@list
575 \endgroup
576 }%
```

`\@affil@footnote` The local definition of `\@affil@opr` when `\@affil@list` is executed by `\@tempaffil@group`. If a match is found to `\@tempc`, then footnotes are formatted with the relevant content.

```
577 \def\@affil@footnote#1#2#3{%
578 \def\@tempa{#1}%
579 \@ifx{\@tempa\@tempc}{%
580 \comma@space
581 \footnote{\@tempb#3}%
582 }{}%
```

```

582 \footnote{#2}%
583 }{}%
584 }%

\@affil@group The local definition of \@affil@opr when the list \@affil@list is executed by
\do@affil@fromgroup: Print the address if its number matches \count@.
585 \def\@affil@group#1#2#3{%
586 \@ifnum{\count@=#1\relax}{%
587 #3%
588 \@ifempty{#2}{}{\footnote{#2}}%
589 \after@address
590 \advance\@tempcnta\m@ne
591 }{}%
592 }%

\email Just tacks the email address on to the current author.
593 \def\sanitize@url{%
594 \@makeother\%%
595 \@makeother\~%
596 \@makeother_%
597 }%
598 \newcommand*\email[1][Electronic address:]{\begingroup\sanitize@url\@email{#1}}%
599 \def\@email#1#2{%
600 \endgroup
601 \expandafter\@author@join@ii\@author{#1}\href{mailto:#2}{#2}}%
602 }%

\homepage Just tacks the URL on to the current author. Note: group opened in \homepage is closed
in \@homepage.
603 \newcommand*\homepage[1][URL:~]{\begingroup\sanitize@url\@homepage{#1}}%
604 \def\@homepage#1#2{%
605 \endgroup
606 \expandafter\@author@join@ii\@author{#1}\url{#2}}%
607 }%

\url
\href 608 \appdef\class@documenthook{%
609 \providecommand\url{\texttt}%
610 \providecommand\href[2]{\url{#2}}%
611 }%

\thanks The \thanks command is only valid when appearing between an \author command
\thanks@warning and preceding the following \affiliation command. That is, it must be subsidiary
\thanks@author to
612 \def\thanks@warning{%
613 \class@warn{\string\thanks\space is valid only following \string\author.^JPlease r
614 \@gobble
615 }%
616 \let\thanks\thanks@warning

```

The operative version of `\thanks` appends an item to `.`'s second argument.

```
617 \def\thanks@author{%
618 \expandafter\@author@join@ii\@author
619 }%
```

`\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.

```
620 \newcommand*\altaffiliation[2][]{%
621 \expandafter\@author@join@ii\@author{#1#2}%
622 }%
```

`\listand` Might need extending with penalties etc.

```
623 \def\@listand{\@ifnum{\@tempcnta=\tw@}{\andname\space}{}}
```

`\@listcomma` This definition, with `\@ne` puts a comma before and. UK English (at least) would normally use `\tw@` here which would then use the more consistent convention of using comma or and but not both.

```
624 \def\@listcomma{\@ifnum{\@tempcnta>\@ne}{,}{}}
```

`\@author@present@group` Basic author-setting wrapper for `\@author@opr`. Depends on class option.

If grouping authors, not much to do except count down the list calling the `\doauthor` hook on each author.

```
625 \def\@author@present@group#1#2#3#4{%
626 \gdef\comma@space{\gdef\comma@space{,\,}}%
627 \doauthor{#1}{#2}{#3}{#4}%
628 \advance\@tempcnta\m@ne
629 }%
```

`\@author@present@script` In the superscript address case, 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.

```
630 \def\@author@present@script#1#2#3#4{%
631 \gdef\comma@space{,\,}%
632 \doauthor{#1}{#2}{#3}{%
633 \expandafter\@affilcomma\@affilID@temp\relax\relax%
634 #4%
635 }%
636 \advance\@tempcnta\m@ne
637 }%
638 \def\@affilcomma#1#2{%
639 #1%
640 \@ifx{\relax#2}{}%
641 ,\,\@affilcomma
642 }%
643 {#2}%
644 }%
```



`\@author@present@count` This version of `\@author@opr` counts the number of authors it processes.  
 645 `\def\@doauthor@count{\advance\@tempcnta\@ne\@gobblefour}`%

`\doauthor` Main control over how authors are typeset.  
 #1 is never loaded  
 #2 is loaded by `\email`, `\homepage`, or `\thanks`  
 #3 is loaded by `\author`  
 #4 Superscript marks for address, and any extra marks from `\@thanks` etc. and is never loaded.

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

```
646 \def\doauthor#1#2#3#4{%
647 \ignorespaces#3\unskip\@listcomma
648 \@ifx{\@affilID@temp\@empty}{\#4}%
649 \@ifempty{#1#2}{\#3}%
650 \@ifx{\@affilID@temp\@empty}{\comma@space}%
651 \author@note{%
652 % \ttfamily
653 #1%
654 \@ifempty{#1}{\@ifempty{#2}{, }}%
655 #2%
656 }%
657 }%
658 \space\@listand
659 }%#4
```

`\@affilID@opr` DPC: The number(s) associated to the affiliation address(es).  
`\@affilID@temp` The control sequence name `\@affilID@opr` is placed in the author list (`\@authors`) every time a new affiliation is encountered, with that affiliation as its argument.  
`\@affilID@def` Alternative procedures are assigned to this control sequence name, and the author list  
`\@affilID@count` is executed, to either count the number of authors at a given address (`\@affilID@count`)  
`\@affilID@match` or to present the given authors (`\@affilID@match`).

The default procedure is to simply define `\@affilID@temp` to the given value (`\@affilID@def`).

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

```
660 \def\@affilID@def#1{%
661 \def\@affilID@temp{#1}%
662 }%
663 \let\@affilID@temp\@empty
664 \let\@affilID@opr\@affilID@def
665 %
666 \def\@affilID@count#1{%
667 \def\@tempb{#1}%
668 \@ifx{\@tempa\@tempb}{%
669 \let\@author@opr\@doauthor@count
670 }{%
```

```

671 \let\@author@opr\@gobblefour
672 }%
673 }%
674 \def\@affilID@match#1{%
675 \def\@tempb{#1}%
676 \@ifx{\@tempa\@tempb}{%
677 \let\@author@opr\@author@present
678 }{%
679 \let\@author@opr\@gobblefour
680 }%
681 }%

```

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

```

682 \def\@thanks{\comma@space\footnote}

```

\@affil@marked Alias \@affil@opr: The affiliations are being formatted in the case where authors are not being grouped: just 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: s/b separate hook. Instead, it is conflated with the hook to be used when printing affiliations

```

683 \def\@affil@marked#1#2#3{%
684 \par
685 \begingroup
686 \frontmatter@affiliationfont
687 \normalfont#1%
688 #3\par
689 \endgroup
690 }%

```

\affils@match Alias \affils@opr, this procedure is used to probe the list of affiliation groups and set a Boolean if a match is found to \@affilID@curr.

```

691 \def\affils@match#1{%
692 \def\@tempa{#1}%
693 \@ifx{\@affilID@curr\@tempa}{%
694 \@booleantrue\temp@sw
695 }{}%
696 }%

```

\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: thus we create an  $n^2$  computing process. FIXME: can use hashing instead, you know.

```

697 \def\do@affil@fromgroup#1#2{%
698 \@ifx{\relax#2}{}%
699 \count@#2\relax
700 #1\do@affil@fromgroup#1%
701 }%
702 }%

```

### 12.3 The keywords command

`\keywords` Usual game, save text in a macro for processing by `\maketitle`.  
`\@keywords` 703 `\def\keywords#1{%`  
704 `\gdef\@keywords{#1}}`  
705 `\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, the  
`\accepted` remainder used only by editors.  
`\published` DPC: As for `\keywords`, but this time don't flag a warning if there is no revision  
`\@date` date specified.  
`\@received` In each case the user-level command defines the value of a macro which buffers the  
`\@revised` data entered by the user. For instance, `\received` causes `\@received` to acquire  
`\@accepted` a value. The optional argument allows the user to override the text that will be typeset  
`\@published` along with the date; the default value of that text is itself a localized macro.

```
706 \newcommand*\date[2][\Dated@name]{\def\@date{#1#2}}%
707 \def\@date{}%
708 \newcommand*\received[2][\Received@name]{\def\@received{#1#2}}%
709 \def\@received{}%
710 \newcommand*\revised[2][\Revised@name]{\def\@revised{#1#2}}%
711 \def\@revised{}%
712 \newcommand*\accepted[2][\Accepted@name]{\def\@accepted{#1#2}}%
713 \def\@accepted{}%
714 \newcommand*\published[2][\Published@name]{\def\@published{#1#2}}%
715 \def\@published{}%
```

### 12.5 The pacs command

PACS, the Physics and Astronomy Classification Scheme.

`\pacs` As for `\keywords`  
`\@pacs` 716 `\def\pacs#1{%`  
717 `\aftermaketitle@chk{\pacs}%`  
718 `\gdef\@pacs{#1}%`  
719 `}%`  
720 `\def\@pacs{}%\class@warn{No PACS numbers}}%`

### 12.6 The `\preprint` command

```
721 \def\preprint#1{\gappdef\@preprint{\preprint{#1}}}%
722 \let\@preprint\@empty
```

### 12.7 draft

DPC: Name clash with draft option. L<sup>A</sup>T<sub>E</sub>X doesn't care, but it confuses me.

This command is a 3.1 relic, now removed.

```
723 %\newcommand\draft{\@booleantrue\draft@sw}%
```

## 12.8 The abstract environment

`\absbox`

```
724 \newbox\absbox
```

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

```
725 % \changes{v4.e}{1998/01/31}
```

```
726 % {hookify}
```

```
727 % Note that the specifics of how the abstract is to be
```

```
728 % formatted are set by \cmd\frontmatter@abstractwidth,
```

```
729 % \cmd\frontmatter@abstractheading, and \cmd\frontmatter@abstractfont.
```

```
730 %
```

```
731 \newenvironment{abstract}{%
```

```
732 \aftermaketitle@chk{\begin{abstract}}%
```

```
733 \lrbox\absbox
```

```
734 \minipage{\frontmatter@abstractwidth}%
```

```
735 \frontmatter@abstractheading
```

```
736 \frontmatter@abstractfont
```

```
737 \let\footnote\mini@note
```

```
738 }{%
```

```
739 \endminipage
```

```
740 \endlrbox
```

```
741 }%
```

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

```
742 \def\frontmatter@abstractheading{%
```

```
743 \begin{center}\large\abstractname\end{center}%
```

```
744 \vspace{-1pc}%
```

```
745 }%
```

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

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

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

```
747 \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.

```
748 \def\frontmatter@abstract@produce{%
```

```
749 \addvspace\frontmatter@preabstractspace
```

```
750 \leavevmode\box\absbox\mini@notes\par
```

```
751 \addvspace\frontmatter@postabstractspace
```

```
752 }%
```

```

frontmatter@preabstractspace Space above and space below abstract in title block
frontmatter@postabstractspace 753 \def\frontmatter@preabstractspace{.5\baselineskip}
754 \def\frontmatter@postabstractspace{.5\baselineskip}

```

## 12.9 Formatting the title block

titlepage This is L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>'s article class version, with modifications.

```

755 \newenvironment{titlepage}{%
756 \twocolumn@sw{\onecolumngrid}{\newpage}%
757 \thispagestyle{titlepage}%
758 \setcounter{page}\@ne
759 }{%
760 \twocolumn@sw{\twocolumngrid}{\newpage}%
761 \twoside@sw{}{%
762 \setcounter{page}\@ne
763 }%
764 }%

```

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

Note: using \@tempcnta and \@tempa to communicate between procedures.

```

765 \def\maketitle{%
766 % \say\@authors
767 \@author@finish
768 \title@column\titleblock@produce
769 \suppressfloats[t]%

```

Now save some memory.

```

770 \let\and\relax
771 \let\affiliation\@gobble@opt@one
772 % \let\address\affiliation
773 \let\author\@gobble
774 \@author@init
775 \let\@authors\@empty
776 \let\@authors@curr\@empty
777 \let\@affil@list\@empty
778 \let\keywords\@gobble
779 \let\@keywords\@empty
780 \let\email\@gobble
781 \let\@address\@empty
782 \let\maketitle\relax
783 \let\thanks\@gobble
784 \titlepage@sw{%
785 \clearpage
786 }{}%
787 }%

```

\titleblock@produce This procedure produces the title block.

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

```

788 \def\titleblock@produce{%
789 \begingroup

```

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

```
790 \groupauthors@sw{%
791 \let\@author@present\@author@present@group
792 \let\frontmatter@author@produce\frontmatter@author@produce@group
793 \let\@tempaffil\@tempaffil@group
794 }{%
795 \let\@author@present\@author@present@script
796 \let\frontmatter@author@produce\frontmatter@author@produce@script
797 \let\@tempaffil\@tempaffil@script
798 }%
799 \let\footnote\footnote@latex
800 \let\thefootnote\frontmatter\thefootnote
801 % \let\@makefnmark\frontmatter\@makefnmark
802 \global\c@footnote\@ne % FIXME: what if the title had a footnote?
803 \let\@makefnmark\frontmatter\@makefnmark
804 \frontmatter@setup
805 \thispagestyle{titlepage}\label{FirstPage}%
```

Produce the title:

```
806 \frontmatter@title@produce
```

Produce the author list:

```
807 \frontmatter@author@produce
```

Produce the dates:

```
808 \frontmatter@RRAPformat{%
809 \expandafter\produce@RRAP\expandafter{\@date}%
810 \expandafter\produce@RRAP\expandafter{\@received}%
811 \expandafter\produce@RRAP\expandafter{\@revised}%
812 \expandafter\produce@RRAP\expandafter{\@accepted}%
813 \expandafter\produce@RRAP\expandafter{\@published}%
814 }%
```

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

```
815 \frontmatter@abstract@produce
816 \@pacs@produce\@pacs
817 \@keywords@produce\@keywords
818 \par
819 \addvspace\frontmatter@finalspace
820 \par
821 \endgroup
822 }%
```

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

Journals will override this procedure.

```
823 \def\frontmatter@title@produce{%
824 \begingroup\@title\par\endgroup
825 \addvspace{\baselineskip}%
826 }%
```

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

In this case, the authors are being grouped above their shared addresses.

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

```
827 \def\frontmatter@author@produce@group{%
828 \begingroup
829 \frontmatter@authorformat
830 \let\@collaboration@opr\@gobblefour
831 \let\@affils@opr\@affils@present\@affils@list
832 \par
833 \endgroup
834 }%
```

`\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; the authors are not being grouped above their shared addresses.

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

```
835 \def\frontmatter@author@produce@script{%
836 \begingroup
837 \frontmatter@authorformat
```

When `\@authors` is executed, `\@tempcnt` counts the number of authors in each collaboration, and `\@tempa` stores a list of number of authors in each collaboration.

```
838 \let\@tempa\@empty
839 \@tempcnta\z@
840 \let\@affilID@opr\@gobble
841 \let\@author@opr\@doauthor@count
842 \let\@collaboration@opr\@collaboration@count
843 \@authors
```

We have now processed the last batch of authors, but there might not be a `\collaboration` at the very end: we emulate what would have happened if there were.

```
844 \appdef@eval\@tempa{\the\@tempcnta}%
845 \reset@authorcount
```

Execute `\@doauthors`, presenting the authors and their affiliations. Upon completion, there will be two spaces following the last letter because of `\listand` processing; remove them.

```
846 \let\@affilID@opr\@affilID@def
847 \let\@author@opr\@author@present
848 \let\@collaboration@opr\@collaboration@present
849 \@authors\unskip\unskip
850 \par
851 \frontmatter@above@affiliation
852 \let\@affil@opr\@affil@marked\@affil@list
853 \par
854 \endgroup
855 }%
```

`\affils@present` Alias of `\affils@opr`, process each element in the affiliation list, presenting all authors with this affiliation.

```
856 \def\affils@present#1{%
```

Count (using `\@tempcnta`) the authors in the author list whose affiliation is #1. Note that `\@tempa` is used as a storage register for the argument of the procedure, for purposes of comparison using `\ifx`.

QUERY: does the value of `\@tempa` and `\@affilID@opr` need to persist?

QUERY: what value does `\@author@opr` have at this point? ANSWER: the `\@affilID@count` procedure assigns a meaning to `\@author@opr` dynamically.

QUERY: what value does `\@collaboration@opr` have at this point? ANSWER: it has been directly defined: the default.

```
857 \def\@tempa{#1}%
858 \let\@affilID@opr\@affilID@count
859 \begingroup
860 \@tempcnta\z@
861 \@authors
```

If no authors at this address, skip it.

```
862 \@ifnum{\@tempcnta=\z@}{}{%
```

DPC: If we have a list of length two, need to locally zap a comma in case we are following the American custom of using ‘, and’ except for lists of length two.

```
863 \begingroup
864 \@ifnum{\@tempcnta=\tw@}{%
865 \let\@listcomma\relax
866 }{}%
```

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

```
867 \let\@affilID@opr\@affilID@match\@authors
868 \endgroup

869 \begingroup
870 \par
871 \frontmatter@above@affiliation
872 \frontmatter@affiliationfont
873 \let\@frontmatter@addressnewline
874 \@tempcnta\z@
875 \@tfor\@tempa:=#1\do{\advance\@tempcnta\@ne}%
876 \@ifnum{\@tempcnta=\tw@}{%
877 \let\@listcomma\@empty
878 }{}%
879 \def\after@address{\@listcomma\ \@listand}%
880 \runinaddress@sw{}{%
881 \tightenlines@sw{}{%
882 \parskip\z@ %space between affilations in grouped mode
883 }%
884 \appdef\@listcomma\par
885 }%
886 \let\@affil@opr\@affil@group
```



```
887 \do@affil@fromgroup\@affil@list#1\relax
888 \endgroup
```

End of branch handling authors.

```
889 }%
890 \par
891 \endgroup
892 \smallskip
893 }%
```

`\reset@authorcount` Pull off the author count for this collaboration, and truncate the list of counts. For a list of length two, suppress comma addition. Note: this procedure communicates through `\@tempcnta` and `\@tempa`.

```
894 \def\reset@authorcount{%
895 \expandafter\@reset@ac\@tempa0\@reset@ac
896 \@ifnum{\@tempcnta=\tw@}{%
897 \let\@listcomma\relax
898 }{%
899 \def\@listcomma{\@ifnum{\@tempcnta>\@ne}{,}{}}%
900 }%
901 }%

902 \def\@reset@ac#1#2\@reset@ac{%
903 \@tempcnta#1%
904 \def\@tempa{#2}%
905 }%
```

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

```
906 \def\@pacs@produce#1{%
907 \showPACS@sw{\parbox[t]{\frontmatter@abstractwidth}{\@pacs@name#1}}}%
908 }%
```

`\@keywords@produce`

```
909 \def\@keywords@produce#1{%
910 % #1\par % FIXME: keywords squelched
911 }%
```

`\frontmatter@thefootnote`

```
912 \def\frontmatter@thefootnote{\@fnsymbol\c@footnote}%
```

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

```
913 \def\frontmatter@makefnmark{\@textsuperscript{\normalfont\@thefnmark}}%
```

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

```
914 \long\def\frontmatter@makefntext#1{%
915 \parindent lem
916 \noindent
917 \@textsuperscript{\normalfont\@thefnmark}#1%
918 }%
```

`\frontmatter@setup` The default type specification for the title page. Journals will override this definition.  
919 `\def\frontmatter@setup{}`%

`\frontmatter@RRAPformat` The procedure `\frontmatter@RRAPformat` is the formatting procedure for the “Received, Revised, etc.” block on the title page. The macro `\punct@RRAP` produces the punctuation between the entries. Journals will override these two definitions.  
`\punct@RRAP`  
`\produce@RRAP` The procedure `\produce@RRAP` is fairly general.  
920 `\def\frontmatter@RRAPformat#1{\begingroup#1\par\endgroup}`%  
921 `\def\punct@RRAP{; }`%  
922 `\def\produce@RRAP#1{`%  
923 `\@ifempty{#1}{}`%  
924 `\@ifvmode{\leavevmode}{\unskip\punct@RRAP\ignorespaces}`%  
925 `#1`%  
926 `}`%  
927 `}`%

`\frontmatter@authorformat` The default type specification for the author list. Journals will override this definition.  
928 `\def\frontmatter@authorformat{}`%

`\frontmatter@above@affiliation` The default amount of space above affiliation. Journals will override this definition.  
929 `\def\frontmatter@above@affiliation{}`%

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

`\frontmatter@finalspace`  
931 `\def\frontmatter@finalspace{2\baselineskip}`

`\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.  
932 `\def\frontmatter@addressnewline{`%  
933 `\@ifhmode{\skip@\lastskip\unskip\unpenalty\break\hskip\skip@}{}`%  
934 `% was: \vskip-.5ex`  
935 `}`%

`\aftermaketitle@chk` Error-checking code.  
936 `\def\aftermaketitle@chk#1{`%  
937 `\@ifx{\maketitle\relax}{`%  
938 `\class@err{\protect#1 must be used before \protect\maketitle}`%  
939 `}`%  
940 `}`%

`\ps@titlepage` Default page style for title page. Journals will override this procedure.  
941 `\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.

```
942 \def\volumeyear#1{\gdef\@volumeyear{#1}}%
943 \def\@volumeyear{}%
944 \def\volumenumber#1{\gdef\@volumenumber{#1}}%
945 \def\@volumenumber{}%
946 \def\issuenumner#1{\gdef\@issuenumner{#1}}%
947 \def\@issuenumner{}%
948 \def\eid#1{\gdef\@eid{#1}}%
949 \def\@eid{}%
950 %
951 \def\startpage#1{\gdef\@startpage{#1}\c@page#1\relax}%
952 \def\@startpage{\pageref{FirstPage}}%
953 \def\endpage#1{\gdef\@endpage{#1}}%
954 \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.

```
955 \def\print@toc#1{%
956 \begingroup
957 % \c@secnumdepth-\maxdimen
958 \expandafter\section
959 \expandafter*%
960 \expandafter{%
961 \csname#1name\endcsname
962 }%
963 \let\appendix\appendix@toc
964 \@starttoc{#1}%
965 \endgroup
966 }%
967 \def\appendix@toc{}%
```

## 13 Body

### 13.1 counters

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

```
968 \def\labelenumi{\theenumi.}
969 \def\theenumi{\arabic{enumi}}
970 \def\labelenumii{(\theenumii)}
971 \def\theenumii{\alph{enumii}}
972 \def\p@enumii{\theenumi}
```

```

973 \def\labelenumiii{\theenumiii.}
974 \def\theenumiii{\roman{enumiii}}
975 \def\p@enumiii{\theenumi(\theenumii)}

976 \def\labelenumiv{\theenumiv.}
977 \def\theenumiv{\Alph{enumiv}}
978 \def\p@enumiv{\p@enumiii\theenumiii}

979 \def\labelitemi{\textbullet}
980 \def\labelitemii{\normalfont\bseries\textendash}
981 \def\labelitemiii{\textasteriskcentered}
982 \def\labelitemiv{\textperiodcentered}

983 \pagenumbering{arabic}

```

## 13.2 float parameters

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

```

984 \setcounter{topnumber}{2}
985 \def\topfraction{.7}
986 \setcounter{bottomnumber}{1}
987 \def\bottomfraction{.7}
988 \setcounter{totalnumber}{3}
989 \def\textfraction{.2}
990 \def\floatpagefraction{.9}
991 \setcounter{dbltopnumber}{2}
992 \def\dbltopfraction{.7}
993 \def\dblfloatpagefraction{.9}

```

## 13.3 List Environments

```

994 \newenvironment{verse}{%
995 \let\@=\@centercr
996 \list{}{%
997 \itemsep\z@ \itemindent -1.5em\listparindent \itemindent
998 \rightmargin\leftmargin\advance\leftmargin 1.5em}\item[]%
999 }{%
1000 \endlist
1001 }%

1002 \newenvironment{quotation}{%
1003 \list{}{%
1004 \listparindent 1.5em
1005 \itemindent\listparindent
1006 \rightmargin\leftmargin \parsep \z@ \@plus\p@}\item[]%
1007 }{%
1008 \endlist
1009 }%

```

```

1010 \newenvironment{quote}{%
1011 \list{}{%
1012 \rightmargin\leftmargin}\item[]%
1013 }{%
1014 \endlist
1015 }%

1016 \def\descriptionlabel#1{%
1017 \hspace\labelsep \normalfont\bfseries #1%
1018 }%

1019 \newenvironment{description}{%
1020 \list{}{%
1021 \labelwidth\z@ \itemindent-\leftmargin
1022 \let\makelabel\descriptionlabel
1023 }%
1024 }{%
1025 \endlist
1026 }%

```

## 13.4 Sectioning Commands

### 13.4.1 Counters and Their Productions

```

1027 \newcounter{part}
1028 \newcounter{section}
1029 \newcounter{subsection}[section]
1030 \newcounter{subsubsection}[subsection]
1031 \newcounter{paragraph}[subsubsection]
1032 \newcounter{subparagraph}[paragraph]

1033 \def\thepart {\Roman{part}} %
1034 \def\thesection {\Roman{section}}
1035 \def\p@section {}
1036 \def\thesubsection {\Alph{subsection}}
1037 \def\p@subsection {\thesection\,}
1038 \def\thesubsubsection {\arabic{subsubsection}}
1039 \def\p@subsubsection {\thesection\,\thesubsection\,}
1040 \def\theparagraph {\alph{paragraph}}
1041 \def\thesubparagraph {\theparagraph.\arabic{subparagraph}}

```

### 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`.

```

1042 \newenvironment{acknowledgments}{%
1043 \@ifx@empty\acknowledgmentsname{%
1044 \par
1045 }{%
1046 \section*{\acknowledgmentsname}%
1047 }%

```

```

1048 }{%
1049 \par
1050 }%
1051 \newenvironment{acknowledgements}{%
1052 \replace@environment{acknowledgements}{acknowledgments}%
1053 }{%
1054 \endacknowledgments
1055 }%

```

### 13.4.3 Part Opener

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

```

1056 \def\part{\par
1057 \addvspace{4ex}
1058 \@afterindentfalse
1059 \secdef\@part\@spart}
1060 \def\@part[#1]#2{%
1061 \@ifnum{\c@secnumdepth >\m@ne}{%
1062 \refstepcounter{part}
1063 \addcontentsline{toc}{part}{\thepart\hspace{1em}#1}%
1064 }{%
1065 \addcontentsline{toc}{part}{#1}%
1066 }%
1067 \begingroup
1068 \parindent \z@ \raggedright
1069 \interlinepenalty\@M
1070 \@ifnum{\c@secnumdepth >\m@ne}{%
1071 \Large \bf \partname~\thepart%
1072 \par\nobreak
1073 }{}%
1074 \huge \bf
1075 #2%
1076 \markboth{}{\}\par
1077 \endgroup
1078 \nobreak
1079 \vskip 3ex
1080 \@afterheading
1081 }%
1082 \def\@spart#1{{\parindent \z@ \raggedright
1083 \interlinepenalty\@M
1084 \huge \bf
1085 #1\par}
1086 \nobreak
1087 \vskip 3ex
1088 \@afterheading}

```

### 13.4.4 Stacked Heads

```

1089 \def\section{%
1090 \@startsection
1091 {section}%
1092 {1}%
1093 {\z@}%
1094 {0.8cm \@pluslex \@minus .2ex}%
1095 {0.5cm \@pluslex \@minus.2ex}%
1096 {%
1097 \normalfont\small\bfseries
1098 \centering
1099 \MakeTextUppercase
1100 }%
1101 }%
1102 \def\@sectioncntformat#1{\csname the#1\endcsname.\quad}%

1103 \def\subsection{%
1104 \@startsection
1105 {subsection}%
1106 {2}%
1107 {\z@}%
1108 {.8cm \@pluslex \@minus .2ex}%
1109 {.5cm \@pluslex \@minus.2ex}%
1110 {%
1111 \normalfont\small\bfseries
1112 \centering
1113 }%
1114 }%

1115 \def\subsubsection{%
1116 \@startsection
1117 {subsubsection}%
1118 {3}%
1119 {\z@}%
1120 {.8cm \@pluslex \@minus .2ex}%
1121 {.5cm \@pluslex \@minus.2ex}%
1122 {%
1123 \normalfont\small\itshape
1124 \centering
1125 }%
1126 }%

13.4.5 Runin Heads

1127 \def\paragraph{%
1128 \@startsection
1129 {paragraph}%
1130 {4}%
1131 {\parindent}%
1132 {\z@}%
1133 {-1em}%
1134 {\normalfont\normalsize\itshape}%
1135 }%

```

```

1136 \def\subparagraph{%
1137 \@startsection
1138 {subparagraph}%
1139 {5}%
1140 {\parindent}%
1141 {3.25ex \@pluslex \@minus .2ex}%
1142 {-1em}%
1143 {\normalfont\normalsize\bfseries}%
1144 }%

```

### 13.5 Math

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

```

1145 \def\theequation{%
1146 \theequation@prefix\arabic{equation}%
1147 }%
1148 \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!

```

1149 \AtEndOfClass{%
1150 \expandafter\input\expandafter{\@pointsize pt\substyle@ext}%
1151 }%

```

### 13.7 All Point Sizes

```

1152 \setcounter{secnumdepth}{4}
1153 \lineskip 1pt
1154 \normallineskip 1pt
1155 \def\baselinestretch{1}%
1156 \@lowpenalty 51
1157 \@medpenalty 151
1158 \@highpenalty 301
1159 \@beginparpenalty -\@lowpenalty
1160 \@endparpenalty -\@lowpenalty
1161 \@itempenalty -\@lowpenalty
1162 \arraycolsep 3pt
1163 \tabcolsep 2pt
1164 \arrayrulewidth .4pt
1165 \doublerulesep 2pt
1166 \skip\@mpfootins = \skip\footins
1167 \fboxsep = 3.0pt

```



```
1168 \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`.

```
1169 \newenvironment{figure}
1170 {\@float{figure}}
1171 {\end@float}
1172 \newenvironment{figure*}
1173 {\@dblfloat{figure}}
1174 {\end@dblfloat}
```

`\@makecaption` More or less the standard caption code, from article class.

```
1175 \newlength\abovecaptionskip
1176 \newlength\belowcaptionskip
1177 \setlength\abovecaptionskip{10\p@}
1178 \setlength\belowcaptionskip{2\p@}

1179 \long\def\@makecaption#1#2{%
1180 \par
1181 \nobreak
1182 \vskip\abovecaptionskip
1183 \sbox\@tempboxa{#1: #2}%
1184 \@ifdim{\wd\@tempboxa >\hsize}{%
1185 \begingroup
1186 \flushing
1187 \let\footnote\@footnotemark@gobble
1188 #1: #2\par
1189 \endgroup
1190 }{%
1191 \global \@minipagefalse
1192 \hb@xt@\hsize{\unhbox\@tempboxa\hfil}%
1193 }%
1194 \vskip\belowcaptionskip
1195 }%

1196 \def\@footnotemark@gobble{%
1197 \@footnotemark
1198 \@ifnextchar[{\@gobble@opt@i}{\@gobble}%
1199 }%

1200 \def\@gobble@opt@i[#1]#2{%
1201 \def\@mpmakefntext#1{%
1202 \flushing
1203 \parindent=1em
1204 \noindent
1205 \hb@xt@1em{\hss\@makefnmark}%
1206 #1%
1207 }%
```

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

```

1208 \newcounter{figure}
1209 \renewcommand \thefigure {\@arabic\c@figure}

1210 \def\fps@figure{tbp}
1211 \def\ftype@figure{1}
1212 \def\ext@figure{lof}
1213 \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.

```

1214 \appdef\class@documenthook{%
1215 \do@if@floats{figure}{.fgx}%
1216 }%
1217 \appdef\class@enddocumenthook{%
1218 \printfigures\relax
1219 }%

```

`\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 `nofloats` 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.

```

1220 \newcommand\printfigures{%
1221 \@ifstar{\true@sw}{\floatp@sw{\true@sw}{\false@sw}}%
1222 {%
1223 \print@float{figure}{\oneapage}%
1224 }{%
1225 \print@float{figure}{}%
1226 }%
1227 }%

```

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

```

1228 \appdef\@xfloat@prep{%
1229 \appdef\@parboxrestore{\centering}%
1230 \let\@makefnmark\@makefnmark@latex
1231 }%

```

## 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 accommodate `\floats@sw`.

```

1232 \newenvironment{table}
1233 {\@float{table}}

```

```

1234 {\end@float}
1235 \newenvironment{table*}
1236 {\@dblfloat{table}}
1237 {\end@dblfloat}

```

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

```

1238 \newcounter{table}
1239 \renewcommand\thetable{\@Roman\c@table}

1240 \def\fps@table{tbp}
1241 \def\ftype@table{2}
1242 \def\ext@table{lot}
1243 \def\fnum@table{\tablename~\thetable}

```

`\tabular@font` 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 `\tabular@font` to be whatever you like. (DPC: `\Huge\color{magenta}...`?)

```

1244 \def\tabular@font{\small}%
1245 \def\squeezetable{\def\tabular@font{\scriptsize}}%

```

### 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.

```

1246 \appdef\class@documenthook{%
1247 \floats@sw}{%
1248 \let@environment{longtable@float}{longtable}%
1249 \let@environment{longtable}{longtable@write}%
1250 }%
1251 \do@if@floats{table}{.tbx}%
1252 }%
1253 \appdef\class@enddocumenthook{%
1254 \printtables\relax
1255 }%
1256 \newenvironment{longtable@write}{%
1257 \write@@float{longtable}{table}%
1258 }{%
1259 \endwrite@float
1260 }%

```

`\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.

```

1261 \newcommand\printtables{%
1262 \begingroup
1263 \let@environment{longtable}{longtable@float}%

```

```

1264 \prepdef\longtable{\trigger@float@par}%
1265 \@ifstar{\true@sw}{\floatp@sw{\true@sw}{\false@sw}}%
1266 {%
1267 \print@float{table}{\oneapage}%
1268 }{%
1269 \print@float{table}{}%
1270 }%
1271 \endgroup
1272 }%

```

## 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
ruledtabular
1273 \def\tabular@hook{}%
1274 \def\endtabular@hook{}%
1275 %\RequirePackage{dcolumn}%
1276 \appdef\class@documenthook{%
1277 \@ifpackageloaded{dcolumn}{%
1278 \newcolumntype{d}{D{.}{.}{-1}}%
1279 }{}%
1280 }%
1281 \def\toprule{\hline\hline}%
1282 \def\colrule{\hline}%
1283 \def\botrule{\hline\hline}%
1284 \newenvironment{ruledtabular}{%
1285 \def\array@default{v}%
1286 \appdef\tabular@font{\def\@halignto{to\hsize}}%
1287 \let\tableleft@skip@default\tableleft@skip
1288 \let\tableleft@skip\tableleft@skip@float
1289 \let\tabmid@skip@default\tabmid@skip
1290 \let\tabmid@skip\tabmid@skip@float
1291 \let\tabright@skip@default\tabright@skip
1292 \let\tabright@skip\tabright@skip@float
1293 \let\array@row@pre@default\array@row@pre
1294 \let\array@row@pre\array@row@pre@float
1295 \let\array@row@pst@default\array@row@pst
1296 \let\array@row@pst\array@row@pst@float
1297 \appdef\array@row@rst{%
1298 \let\array@row@pre\array@row@pre@default
1299 \let\array@row@pst\array@row@pst@default
1300 \let\tableleft@skip\tableleft@skip@default
1301 \let\tabmid@skip\tabmid@skip@default
1302 \let\tabright@skip\tabright@skip@default
1303 \appdef\tabular@font{\let\@halignto\@empty}%
1304 }%
1305 }%

```

```
1306 }%
```

## 15 Footnote Text

```
\@makefntext
```

```
1307 \newcommand\@makefntext[1]{%
1308 \def\baselinestretch{1}%
1309 \reset@font\footnotesize
1310 \parindent 1em%
1311 \noindent
1312 \hb@xt@1.8em{\hss\@makefnmark}%
1313 #1\par
1314 }%
```

### 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.

```
1315 \newenvironment{thebibliography}{}{}%
1316 \let\@listi\@empty
1317 \RequirePackage[sort&compress]{natbib}[1999/05/28 7.0]%
1318 \let\NAT@thebibliography\thebibliography
1319 \let\NAT@endthebibliography\endthebibliography
1320 \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.
```

```
1321 \renewcommand\NAT@citesuper[3]{%
1322 \ifNAT@swa
1323 \leavevmode
1324 \unskip
1325 % \hspace{1\p@}%
1326 #1%
```

```

1327 \if*#3*\else\ (#3)\fi
1328 \else
1329 #1%
1330 \fi
1331 \endgroup
1332 }%

```

`\@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.

```

1333 \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 REV<sub>T</sub>EX is now incompatible with any package that patches `\bibliographystyle`, except for those (like `natbib`) that load before here.

```

1334 \let\bibliographystyle@latex\bibliographystyle
1335 \def\bibliographystyle{\def\@bibstyle}%

```

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

`\bibfont` This way of setting up the bibliography automatically sets the label width based on the largest number used within the bibliography. This scheme will not work properly using the Harvard style of bib entry, though.

`\@biblabel` In `\bibfont` is the class's default `\place@bibnumber`. If neither the document nor the journal substyle has made a selection at that late moment, the following selection will prevail and avoid this procedure being undefined.

```

1336 \def\bibsection{%
1337 \@ifx@empty\refname{%
1338 \par
1339 }{%
1340 \section*\refname}%
1341 }%
1342 }%
1343 \def\class@bibsetup#1{\NAT@bibsetup{\ref{LastBibItem}}}%
1344 \let\bibpreamble\@empty
1345 \def\bibfont{%
1346 \bibsep\z@\relax
1347 \let\NAT@bibsetup\@bibsetup
1348 \let\@bibsetup\class@bibsetup
1349 \@ifxundefined\place@bibnumber{%
1350 \let\@biblabel\place@bibnumber@inl
1351 }{%
1352 \let\@biblabel\place@bibnumber
1353 }%
1354 \def\newblock{\ }%
1355 }%

```

`\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.

Nonetheless 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!

```
1356 \let\NAT@citeyear\citeyear
1357 \def\NAT@onlinecite#1{%
1358 \begingroup
1359 \let\@cite\NAT@citenum
1360 \let\NAT@mbox\mbox
1361 \let\citeyear\NAT@citeyear
1362 \def\NAT@space{ }%
1363 \cite{#1}%
1364 \endgroup
1365 }%
```

`\onlinecite` We assign default meaning to two citation commands; `\onlinecite` is used when a citation should appear on the baseline (as opposed to superscripted), and `\textcite` is used for a textual citation (`\cite` gives a parenthetical citation.)

```
1366 \appdef\class@inithook{%
1367 \@ifxundefined\onlinecite{\def\onlinecite{\citealp}}{}%
1368 \@ifxundefined\textcite{\def\textcite{\citet}}{}%
1369 }%
```

`thebibliography` We put a tail patch into `\thebibliography` and a headpatch into `\endthebibliography`.

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.)

```
1370 \renewenvironment{thebibliography}[1]{%
1371 \NAT@thebibliography{#1}%
1372 \@bibnotes
1373 }{%
1374 \@endnotesinbib
1375 \edef\@currentlabel{\arabic{NAT@ctr}}%
1376 \label{LastBibItem}%
1377 \NAT@endthebibliography
1378 \aftergroup\let
1379 \aftergroup\auto@bib
1380 \aftergroup\@empty
1381 }%
```

`\place@bibnumber@sup` Two procedures to select from: produce the `\bibitem` device.

```
1382 %\let\@openbib@code\@empty
1383 \def\place@bibnumber@sup#1{#1}%
1384 \def\place@bibnumber@inl#1{[#1]}%
```

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

FIXME: check hyperref compatibility!

`\rtx@bibnote` A version of footnote that appears at the start of the bibliography, most likely used as `\frontmatter@footnote`.

Note: this procedure accumulates material in a macro, taxing T<sub>E</sub>X's mem.

```
1385 \def\rtx@bibnote{\bib@note\@bibnotes}%Implicit #1
1386 \def\bib@note#1#2{%
1387 \stepcounter\@mpfn
1388 \protected@xdef\@thefnmark{\thempfn}%
1389 \protected@xdef\@@thefnmark{\normalfont\thempfn}%
1390 \@footnotemark
1391 \expandafter\g@addto@macro
1392 \expandafter#1%
1393 \expandafter{%
1394 \expandafter \item
1395 \expandafter [\@@thefnmark]#2\par
1396 }%
1397 }%
1398 \let\@bibnotes\@empty
```

`\mini@note`

```
\save@note 1399 \def\mini@note{\save@note\mini@notes}%Implicit #1
1400 \def\save@note#1#2{%
1401 \stepcounter\@mpfn
1402 \protected@xdef\@thefnmark{\thempfn}%
1403 \@footnotemark
1404 \expandafter\g@addto@macro
1405 \expandafter#1%
1406 \expandafter{%
1407 \expandafter \@@footnotetext
1408 \expandafter {\@thefnmark}{#2}%
1409 }%
1410 }%
1411 \long\def\@@footnotetext#1{\def\@thefnmark{#1}\@footnotetext}%
1412 \let\mini@notes\@empty
```

`\endnote` A version of footnote that appears at the end of the document. Actually it just appears where `\printendnotes` appears.

```
1413 \def\endnote{%
1414 \@ifnextchar[{%
1415 \@xendnote
1416 }{%
1417 \stepcounter{footnote}%
1418 \protected@xdef\@thefnmark{\thefootnote}%
1419 \@footnotemark
1420 \@endnotetext
1421 }%
1422 }%
```



```

\@xendnote
1423 \def\@xendnote[#1]{%
1424 \begingroup
1425 \c@footnote#1\relax
1426 \unrestored@protected@xdef\@thefnmark{\thefootnote}%
1427 \endgroup
1428 \@footnotemark
1429 \@endnotetext
1430 }%

\endnote@ext
1431 \def\endnote@ext{.end}%

\@endnotetext The commands \label, \index, and \glossary, which are robustified for \markright
and \addcontentsline, are likewise robustified here.
1432 \long\def\@endnotetext#1{%
1433 \ifxundefined\@endnoteout{%
1434 \newwrite\@endnoteout
1435 \gdef\endnote@stream{\jobname\endnote@ext}%
1436 \immediate\openout\@endnoteout\endnote@stream\relax
1437 }{}%
1438 \begingroup
1439 \let\label\relax \let\index\relax \let\glossary\relax
1440 \let\cite\relax \let\ref\relax \let\pageref\relax
1441 \let\\\relax
1442 \let\protect\noexpand
1443 \newlinechar`\^M%
1444 % \newlinechar` \ %
1445 \immediate\write\@endnoteout{\noexpand\doendnote{\@thefnmark}{#1}}%
1446 \endgroup
1447 }%

\endnotetext
1448 \def\endnotetext{%
1449 \@ifnextchar[{%
1450 \@xendnotenext
1451 }{%
1452 \protected@xdef\@thefnmark{\thefootnote}\@endnotetext
1453 }%
1454 }%

\@xendnotenext
1455 \def\@xendnotenext[#1]{%
1456 \begingroup
1457 \c@footnote#1\relax
1458 \unrestored@protected@xdef\@thefnmark{\thefootnote}%
1459 \endgroup
1460 \@endnotetext
1461 }%

```

`\printendnotes`

```
1462 \def\printendnotes{%
1463 \@ifx{\@endnoteout\@undefined}}{}{%
1464 \begingroup
1465 \c@secnumdepth-\maxdimen
1466 \section{%
1467 \notesname
1468 }%
1469 \immediate\closeout\@endnoteout
1470 \global\let\@endnoteout\@undefined
1471 \begin{enumerate}%
1472 \makeatletter
1473 \input{\endnote@stream}%
1474 \end{enumerate}%
1475 \endgroup
1476 }%
1477 }%
1478 \appdef\class@enddocumenthook{%
1479 \printendnotes
1480 }%
```

`\firstnote@num` In REV<sub>T</sub>EX, 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`.

```
1481 \mathchardef\firstnote@num\z@
1482 \appdef\class@documenthook{%
1483 \global\c@footnote\firstnote@num
1484 \appdef\maketitle{\global\c@footnote\firstnote@num}%
1485 }%
1486 \def\set@firstnote#1{%
1487 \@ifnum{\firstnote@num=#1\relax}}{}{%
1488 \class@warn@end{Endnote numbers changed: rerun LaTeX}%
1489 }%
1490 \immediate\write\@mainaux{%
1491 \global\chardef\string\firstnote@num#1\relax
1492 }%
1493 }%
```

`\@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.

```

1494 \def\@endnotesinbib{%
1495 \set@firstnote\z@
1496 }%
1497 \def\@endnotesinbibliography{%
1498 \expandafter\set@firstnote\expandafter{\the\c@NAT@ctr}%
1499 \@ifx{\@endnoteout\@undefined}{\}%
1500 \immediate\closeout\@endnoteout
1501 \global\let\@endnoteout\@undefined
1502 \makeatletter
1503 \input{\endnote@stream}%
1504 }%
1505 }%
1506 \appdef\class@documenthook{%
1507 \footinbib@sw{%
1508 \let\footnote\endnote
1509 \let\printendnotes\relax
1510 \let\@endnotesinbib\@endnotesinbibliography
1511 \let\@makefnmark@latex\@makefnmark
1512 \let\@makefnmark\@makefnmark@cite
1513 \appdef\class@endpagegridhook{\auto@bib}%
1514 }{\}%
1515 }%

```

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

```

1516 \def\auto@bib{%
1517 \@ifx@empty\@bibnotes{%
1518 \@ifxundefined\@endnoteout{%
1519 \false@sw
1520 }{\%
1521 \true@sw
1522 }%
1523 }{\%
1524 \true@sw
1525 }{\%
1526 \begin{thebibliography}{\}\end{thebibliography}%
1527 }%
1528 }%

```

\@doendnote

```

1529 \def\@doendnote#1#2{\bibitem{endnote#1}#2}

```

\@bibnotes

```

1530 \let\@bibnotes\@empty

```

## 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!

```
1531 \appdef\class@documenthook{%
1532 \preprintsty@sw{\ps@footer}{\ps@article}%
1533 \pagenumbering{arabic}%
1534 \normalsize
1535 \tabbingsep \labelsep
1536 \leftmargin\leftmargini
1537 \labelwidth\leftmargin\advance\labelwidth-\labelsep
1538 \let\@listi\@listI
1539 \@listi

1540 \twoside@sw{}{%
1541 \raggedbottom
1542 }%
```

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

```
1543 \mark@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??

```
1544 \twocolumn@sw{%
1545 \open@column@mlt\tw@
1546 \set@colht
1547 \@floatplacement
1548 \@dblfloatplacement
1549 \sloppy
1550 \raggedbottom
1551 \let\set@listindent\set@listindent@
1552 }{%
1553 \open@column@one\@ne
1554 \set@colht
1555 \@floatplacement
1556 \@dblfloatplacement
1557 \sloppy
1558 \raggedbottom
1559 \let\set@listindent\set@listindent@parshape
1560 }%
1561 }%
```

## 17 \appendix

```
1562 %\newif\ifappendixon
```

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

```
1563 \def\appendix{%
1564 \par
1565 % \appendixontrue
1566 \setcounter{section}\z@
1567 \setcounter{subsection}\z@
1568 \setcounter{subsubsection}\z@
1569 \def\thesection{\Alph{section}}%
1570 \def\thesubsection{\arabic{subsection}}%
1571 \def\thesubsubsection{\alph{subsubsection}}%
1572 \@addtoreset{equation}{section}%
1573 \def\theequation@prefix{\thesection}%
1574 \addtocontents{toc}{\protect\appendix}%
1575 }%
```

## 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 1576 \def\title@column@default#1{#1}%
1577 \def\close@column@default{ }%
```

### 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.

```
1578 \def\galley@outdent{\rightmargin-\columnwidth\advance\rightmargin-\columnsep}%
1579 \let\widetext@outdent\@empty
1580 \newenvironment{widetext@galley}{%
1581 \list{}{%
1582 \topsep \z@skip
1583 \listparindent \parindent
1584 \itemindent \parindent
1585 \leftmargin \z@
1586 \parsep \z@\@plus\p@
1587 \widetext@outdent
1588 \relax
1589 }%
1590 \item\relax
1591 }{
1592 \endlist
1593 }%
```

### 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`.

```
1594 \def\title@column@grid#1{%
1595 \onecolumngrid
1596 \begingroup
1597 \let\@footnotetext\@mpfootnotetext
1598 \let\set@footnotewidth\set@footnotewidth@ii
1599 #1%
1600 \endgroup
1601 \twocolumngrid
1602 \@ifvoid\@mpfootins{}{%
1603 \insert\footins\bgroup\unvbox\@mpfootins\egroup
1604 }%
1605 }%
1606 \def\set@footnotewidth@ii{%
1607 \columnwidth\textwidth
1608 \advance\columnwidth\columnsep
1609 \divide\columnwidth\tw@
1610 \advance\columnwidth-\columnsep
1611 }%
1612 \def\close@column@grid{%
1613 \onecolumngrid
1614 \twocolumngrid
1615 }%
```

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

```
1616 \newenvironment{widetext@grid}{%
1617 \par\ignorespaces\onecolumngrid
1618 }{%
1619 \par\twocolumngrid\global\@ignoretrue
1620 \@endpetrue
1621 }%
```

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

```
1622 \appdef\class@documenthook{%
1623 \twocolumn@sw{%
1624 \let@environment{widetext}{widetext@grid}%
1625 \let\title@column\title@column@grid
1626 \let\close@column\close@column@grid
1627 }{%
1628 \let@environment{widetext}{widetext@galley}%
1629 \preprintsty@sw{%
```

Change the page grid not at all.

```
1630 }{%
 If we are galley style, change the page margin only.
1631 \galley@sw{%
1632 \let\widetext@outdent\galley@outdent
1633 }{%
1634 }%
1635 }%
1636 }%
1637 }%
```

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

```
1638 \appdef\class@inithook{%
1639 \@ifxundefined\title@column{%
1640 \let\title@column\title@column@default
1641 }{}%
1642 }%
```

## 19 Old font commands

```
1643 \DeclareOldFontCommand{\rm}{\normalfont\rmfamily}{\mathrm}
1644 \DeclareOldFontCommand{\sf}{\normalfont\sffamily}{\mathsf}
1645 \DeclareOldFontCommand{\tt}{\normalfont\ttfamily}{\mathtt}
1646 \DeclareOldFontCommand{\bf}{\normalfont\bfseries}{\mathbf}
1647 \DeclareOldFontCommand{\it}{\normalfont\itshape}{\mathit}
1648 \DeclareOldFontCommand{\sl}{\normalfont\slshape}{\@nomath\sl}
1649 \DeclareOldFontCommand{\sc}{\normalfont\scshape}{\@nomath\sc}
1650 \DeclareRobustCommand*\cal{\@fontswitch\relax\mathcal}
1651 \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 the conventional macros of the form `\...name`

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.

```
1652 \def\today{\ifcase\month\or
1653 January\or February\or March\or April\or May\or June\or
1654 July\or August\or September\or October\or November\or December\fi
1655 \space\number\day, \number\year}
```

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

```
1656 \def\notesname{Notes}
```

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

```
1657 \def\partname{Part}
```

`\tocname` Text entity `\tocname` is used in `\tableofcontents`, as defined in the standard L<sup>A</sup>T<sub>E</sub>X book class.  
1658 `\def\tocname{Contents}`

`\lofname` Text entity `\lofname` is used in `\listoffigures`, as defined in the standard L<sup>A</sup>T<sub>E</sub>X book class.  
1659 `\def\lofname{List of Figures}`

`\lotname` Text entity `\lotname` is used in `\listoftables`, as defined in the standard L<sup>A</sup>T<sub>E</sub>X book class.  
1660 `\def\lotname{List of Tables}`

`\refname` Text entity `\refname` is used in the bibliography.  
1661 `\def\refname{References}`

`\indexname` Text entity `\indexname` is used in the index, as defined in the standard L<sup>A</sup>T<sub>E</sub>X book class.  
1662 `\def\indexname{Index}`

`\figurename` Text entity `\figurename` is used in `figure`, `\figuresname` in `\printfigures`.  
1663 `\def\figurename{FIG. }`  
1664 `\def\figuresname{Figures}%`

`\tablename` Text entity `\tablename` is used in `table`, `\tablesname` in `\printtables`.  
1665 `\def\tablename{TABLE}`  
1666 `\def\tablesname{Tables}%`

`\abstractname` Text entity `\abstractname` is used in `abstract`.  
1667 `\def\abstractname{Abstract}`

`\appendixesname` Text entity `\appendixesname` is used in TOC.  
`\appendixname` 1668 `\def\appendixesname{Appendixes}%`  
1669 `\def\appendixname{Appendix}%`

`\acknowledgmentsname` Text entity `\acknowledgmentsname` is used in `acknowledgments`.  
1670 `\def\acknowledgmentsname{Acknowledgments}`

`\journalname` This should be set by the society journal options, eg ‘pra’.  
1671 `\def\journalname{??}`

`\copyrightname` Default layout does not assign copyright, but a journal that wants to might use this.  
1672 `\def\copyrightname{??}`

`\andname` The text string “and” for use in author lists.  
1673 `\def\andname{and}`

`\@pacs@name` The text string prepended to PACS numbers.  
1674 `\def\@pacs@name{PACS numbers: }%`



```

\ppname The text string “pp” for use in page ranges.
1675 \def\ppname{pp}

\numbername The text string “number” for use in article reference.
1676 \def\numbername{number}

\volumename The text string “volume” for use in article reference.
1677 \def\volumename{volume}

\Dated@name These texts are used in the \date, et al. commands.
\Received@name 1678 \def\Dated@name{dated: }%
\Revised@name 1679 \def\Received@name{received }%
\Accepted@name 1680 \def\Revised@name{revised }%
\Published@name 1681 \def\Accepted@name{accepted }%
1682 \def\Published@name{published }%

```

## 21 Uppercase

A better definition is available in `textcase.sty` on ctan (skips mathematics).

```

1683 \appdef\class@inithook{%
1684 \providecommand\MakeTextUppercase{\MakeUppercase}%
1685 }%

```

## 22 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.

```

1686 \def\address{\replace@command\address\affiliation}%
1687 \def\altaddress{\replace@command\altaddress\altaffiliation}%
1688 \newenvironment{references}{%
1689 \class@warn@end{The references environment is not supported; use thebibliography i
1690 \gdef\references{\thebibliography{}}\references
1691 }{%
1692 \endthebibliography
1693 }%
1694 \def\draft{%
1695 \class@warn@end{Command \string\draft\space is obsolete;^^JInvoke option draft ins
1696 \@booleantrue\draft@sw
1697 }%
1698 \def\tighten{%
1699 \class@warn@end{Command \string\tighten\space is obsolete;^^JInvoke option tighten
1700 \@booleantrue\tightenlines@sw
1701 }%
1702 \def\tableline{%

```

```

1703 \noalign{%
1704 \class@warn@end{Command \string\tableline\space is obsolete;^^JUUse \string\colrule
1705 \global\let\tableline\colrule
1706 }%
1707 \tableline
1708 }%
1709 \def\case{\replace@command\case\frac}%
1710 \def\slantfrac{\replace@command\slantfrac\frac}%
1711 \def\tablenote{\replace@command\tablenote\footnote}%
1712 \def\tablenotemark{\replace@command\tablenotemark\footnotemark}%
1713 \def\tablenotetext{\replace@command\tablenotetext\footnotetext}%
1714 % Lose the following definition:
1715 \DeclareRobustCommand\REV@text[1]{%
1716 \relax
1717 \ifmmode
1718 \mathchoice
1719 {\hbox{\everymath{\displaystyle #1}}}%
1720 {\hbox{\everymath{\textstyle #1}}}%
1721 {\hbox{\everymath{\scriptstyle #1}\let\f@size\sf@size\selectfont#1}}%
1722 {\hbox{\everymath{\scriptscriptstyle #1}\let\f@size\ssf@size\selectfont#1}}%
1723 \glb@settings
1724 \else
1725 \mbox{#1}%
1726 \fi
1727 }%
1728 % Lose the following definition:
1729 \DeclareRobustCommand\REV@bbox[1]{%
1730 \relax
1731 \ifmmode
1732 \mathchoice
1733 {\hbox{\everymath{\displaystyle #1}\boldmath$#1$}}%
1734 {\hbox{\everymath{\textstyle #1}\boldmath$#1$}}%
1735 {\hbox{\everymath{\scriptstyle #1}\boldmath$#1$}}%
1736 {\hbox{\everymath{\scriptscriptstyle #1}\boldmath$#1$}}%
1737 \glb@settings
1738 \else
1739 \mbox{#1}%
1740 \fi
1741 }%
1742 \DeclareRobustCommand\REV@bm[1]{%
1743 \class@warn@end{To use \string\bm, please load the bm package!}%
1744 \global\let\bm\relax
1745 }%
1746 \def\FL{\obsolete@command\FL}%
1747 \def\FR{\obsolete@command\FR}%
1748 \def\narrowtext{\obsolete@command\narrowtext}%
1749 \def\mediumtext{\obsolete@command\mediumtext}%
1750 \newenvironment{quasitable}{%
1751 \let@environment{tabular}{longtable}%
1752 }%

```

```

1753 }%

\text If not otherwise defined, give default meanings to certain commands.
\bm 1754 \appdef\class@inithook{%
\bbinfo 1755 \@ifxundefined\text{\let\text\REV@text}{}%
\eprint 1756 \@ifxundefined\bm{\let\bm\REV@bm}{}%
\url 1757 \providecommand\bbinfo[2]{#2}%
1758 \providecommand\eprint[2][{}]{#2}%
1759 \providecommand\url[1]{#1}%
1760 }%

\bbox
1761 \def\bbox#1{%
1762 \class@warn@end{\string\bbox\space is obsolete,^^Jload the bm package and use \str
1763 \global\let\bbox\relax
1764 }%

\mathletters
1765 \newenvironment{mathletters}{%
1766 \class@warn@end{Environment {mathletters} is obsolete;^^Jload the amsmath package a
1767 \global\let\mathletters\@empty
1768 }{%
1769 }%

\eqnum
1770 \def\eqnum#1{%
1771 \class@warn@end{\string\eqnum\space is obsolete, load the amsmath package and use
1772 \global\let\eqnum\@gobble
1773 }%

We read in the symbol definitions.
1774 \RequirePackage{revsymb}%

```

## 23 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.

## 23.1 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 REV $\TeX$  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 $\TeX$  guide to document classes, `revtex4.dtxclsguide.tex` or read up on the subject in a book like the L $\TeX$  Companion.

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

```
1775 \AtEndOfClass{%
1776 \InputIfFileExists{\jobname.rty}{}{}%
1777 }%
```

## 23.2 `\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.

```
1778 \AtEndOfClass{%
1779 \@ifxundefined\secnumarabic@sw{\@booleanfalse\secnumarabic@sw}{}%
1780 \secnumarabic@sw{%
1781 \def\p@section {}%
1782 \def\thesection {\arabic{section}}%
1783 \def\p@subsection {}%
1784 \def\thesubsection {\thesection.\arabic{subsection}}%
1785 \def\p@subsubsection {}%
1786 \def\thesubsubsection {\thesubsection.\arabic{subsubsection}}%
1787 }{}%
1788 }%
```

## 23.3 Define the Bibliography Style

This portion of the code for this class file *must* appear at the very end, after the journal substyle has set the default value of `\@bibstyle`.

\@bibstyle

```
1789 \AtEndOfClass{%
1790 \appdef\class@documenthook{%
1791 \@ifxundefined\@bibstyle}{%
1792 \expandafter\bibliographystyle@latex\expandafter{\@bibstyle}%
1793 }%
1794 }%
1795 }%
```

## 23.4 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?

```
1796 \AtEndOfClass{%
1797 \appdef\class@documenthook{%
1798 \defaults@hook
1799 }%
1800 }%
1801 \@ifxundefined\defaults@hook{\let\defaults@hook\@empty}{%}
```

End of the class file.

```
1802 %</class-pst>
```

## 24 Symbols: the revsymb module

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

```
1803 %<*revsymb>
1804 \def\REVSymb@warn#1{\PackageWarningNoLine{revsymb}{#1}}%
```

\lambdabar

```
1805 \DeclareRobustCommand\lambdabar{%
1806 \bgroup
1807 \def\@tempa{%
1808 \hbox{%
1809 \raise.73\ht\z@
1810 \hb@xt@\z@{%
1811 \kern.25\wd\z@
1812 \vrule \@width.5\wd\z@\@height.1\p@\@depth.1\p@
1813 \hss
1814 }%
1815 \box\z@
1816 }%
1817 }%
```

```

1818 \mathchoice
1819 {\setbox\z@\hbox{\$\displaystyle \lambda$}\@tempa}%
1820 {\setbox\z@\hbox{\$\textstyle \lambda$}\@tempa}%
1821 {\setbox\z@\hbox{\$\scriptstyle \lambda$}\@tempa}%
1822 {\setbox\z@\hbox{\$\scriptscriptstyle\lambda$}\@tempa}%
1823 \egroup
1824 }%

\openone DPC: Really should use a font that includes this glyph. Unfortunately not in AMS ones,
but is in bold, cmbb. (I think, must check), FIXME: check for bold.
1825 \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.
1826 \DeclareRobustCommand\corresponds{\replace@command\corresponds\triangleq}%
1827 \DeclareRobustCommand\overcirc{\replace@command\overcirc\mathring}%
1828 \DeclareRobustCommand\overdots{\replace@command\overdots\ddot}%
1829 \DeclareRobustCommand\REV@triangleq{%
1830 {\lower.2ex\hbox{=}}{\kern-.75em^{\triangle}}%
1831 }%
1832 \DeclareRobustCommand\REV@ddot[1]{%
1833 \@ontopof{#1}{\cdots}{1.0}\mathord{\box2}%
1834 }%

\succsim These version 3.1 commands are always supplied, but the definitions in amssymb are
\precsim preferred.
\lesssim 1835 \DeclareRobustCommand\altsuccsim{\succ\kern-.9em_\sim\kern.3em}%
\gtrsim 1836 \DeclareRobustCommand\altprecsim{\prec\kern-1em_\sim\kern.3em}%
\alt 1837 \let\REV@succsim\altsuccsim
\agt 1838 \let\REV@precsim\altprecsim
1839 \DeclareRobustCommand\REV@lesssim{\mathrel{\mathpalette\vereq{<}}}%
1840 \DeclareRobustCommand\REV@gtrsim{\mathrel{\mathpalette\vereq{>}}}%
1841 \DeclareRobustCommand\alt{\lesssim}
1842 \DeclareRobustCommand\agt{\gtrsim}
1843 \def\vereq#1#2{%
1844 \lower3\p@\vbox{%
1845 \baselineskip1.5\p@
1846 \lineskip1.5\p@
1847 \ialign{\$@m@th#1\hfill##\hfil$\crcr#2\crcr\sim\crcr}%
1848 }%
1849 }%

\tensor
\overstar 1850 \DeclareRobustCommand\tensor[1]{\@ontopof{#1}{\leftrightharpoonup}{1.15}\mathord{\box2}}
\loarrow 1851 \DeclareRobustCommand\overstar[1]{\@ontopof{#1}{\ast}{1.15}\mathord{\box2}}
\roarrow 1852 \DeclareRobustCommand\loarrow[1]{\@ontopof{#1}{\leftarrow}{1.15}\mathord{\box2}}

```

```

1853 \DeclareRobustCommand\roarrow[1]{\@ontopof{#1}{\rightarrow}{1.15}\mathord{\box2}}

\@ontopof
1854 \def\@ontopof#1#2#3{%
1855 {%
1856 \mathchoice
1857 {\@ontopof{#1}{#2}{#3}\displaystyle \scriptstyle }%
1858 {\@ontopof{#1}{#2}{#3}\textstyle \scriptstyle }%
1859 {\@ontopof{#1}{#2}{#3}\scriptstyle \scriptscriptstyle}%
1860 {\@ontopof{#1}{#2}{#3}\scriptscriptstyle\scriptscriptstyle}%
1861 }%
1862 }%

@@ontopof Same as REVTeX3, more or less.
1863 \def@@ontopof#1#2#3#4#5{%
1864 \setbox\z@\hbox{#4#1$}%
1865 \setbox\f@\hbox{#5#2$}%
1866 \setbox\tw@\null\ht\tw@\ht\z@ \dp\tw@\dp\z@
1867 \@ifdim{\wd\z@>\wd\f@}{%
1868 \setbox\f@\hb@xt@\wd\z@{\hss\box\f@\hss}%
1869 \mathord{\rlap{\raise#3\ht\z@\box\f@}\box\z@}%
1870 }{%
1871 \setbox\f@\hb@xt@.9\wd\f@{\hss\box\f@\hss}%
1872 \setbox\z@\hb@xt@\wd\f@{\hss$#4\relax#1$hss}%
1873 \mathord{\rlap{\copy\z@}\raise#3\ht\z@\box\f@}%
1874 }%
1875 }%

\frak Deal with legacy \frak: if amsfonts not loaded, defined in such a way as to ask for
that package. Also, says to use \mathfrak instead.
1876 \DeclareRobustCommand\frak{%
1877 \REVSymb@warn{%
1878 Command \string\frak\space unsupported:^^J%
1879 please use \string\mathfrak\space instead.%
1880 }%
1881 \global\let\frak\mathfrak
1882 \frak
1883 }%
1884 \DeclareRobustCommand\REV@mathfrak{%
1885 \REVSymb@warn{%
1886 Command \string\mathfrak\space undefined:^^J%
1887 please specify the amsfonts or amssymb option!%
1888 }%
1889 \global\let\mathfrak\@firstofone
1890 \mathfrak
1891 }%

\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.

```

```

1892 \DeclareRobustCommand\Bbb{%
1893 \REVSymb@warn{%
1894 Command \string\Bbb\space unsupported:^^J%
1895 please use \string\mathbb\space instead.%
1896 }%
1897 \global\let\Bbb\mathbb
1898 \Bbb
1899 }%
1900 \DeclareRobustCommand\REV@mathfrak{%
1901 \REVSymb@warn{%
1902 Command \string\mathbb\space undefined:^^J%
1903 please specify the amsfonts or amssymb option!%
1904 }%
1905 \global\let\mathbb\@firstofone
1906 \mathbb
1907 }%

```

`\Bigglb` 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!

```

1908 \def\Bigglb{\REV@boldopen \Bigg}%
1909 \def\Biglb {\REV@boldopen \Big }%
1910 \def\bigglb{\REV@boldopen \bigg}%
1911 \def\biglb {\REV@boldopen \big }%
1912 \def\Biggrb{\REV@boldclose\Bigg}%
1913 \def\Bigrb {\REV@boldclose\Big }%
1914 \def\biggrb{\REV@boldclose\bigg}%
1915 \def\bigrb {\REV@boldclose\big }%
1916 \def\REV@pmb#1{%
1917 \hbox{%
1918 \setbox\z@=\hbox{#1}%
1919 \kern-.02em\copy\z@\kern-\wd\z@
1920 \kern .04em\copy\z@\kern-\wd\z@
1921 \kern-.02em
1922 \raise.04em\copy\z@
1923 }%
1924 }%
1925 \def\REV@boldopen #1#2{\mathopen {\REV@pmb{#1#2}}}%
1926 \def\REV@boldclose#1#2{\mathclose {\REV@pmb{#1#2}}}%

```

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

```

1927 \appdef\class@inithook{%
1928 \@ifxundefined\ddot{\let\ddot\REV@ddot}{}%
1929 \@ifxundefined\triangleq{\let\triangleq\REV@triangleq}{}%
1930 \@ifxundefined\succsim{\let\succsim\altsuccsim}{}%
1931 \@ifxundefined\precsim{\let\precsim\altprecsim}{}%
1932 \@ifxundefined\lessim{\let\lessim\REV@lessim}{}%
1933 \@ifxundefined\gtrsim {\let\gtrsim \REV@gtrsim }{%
1934 \@ifxundefined\mathfrak{\let\mathfrak\REV@mathfrak}{}%

```



```

1935 \@ifxundefined\mathbb{\let\mathbb\REV\mathbb}{}%
1936 }%

1937 %</revsymb>

```

## 25 The 10pt class option: the 10pt module

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

```

1938 %<*10pt>

1939 \def\normalsize{%
1940 \@setfontsize\normalsize\@xpt{11.5}%
1941 \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
1942 \belowdisplayskip \abovedisplayskip
1943 \abovedisplayshortskip \abovedisplayskip
1944 \belowdisplayshortskip \abovedisplayskip
1945 \let\@listi\@listI
1946 }%

1947 \def\small{%
1948 \@setfontsize\small\@ixpt{11}%
1949 \abovedisplayskip 8.5\p@ \@plus3\p@ \@minus4\p@
1950 \belowdisplayskip \abovedisplayskip
1951 \abovedisplayshortskip \z@ \@plus2\p@
1952 \belowdisplayshortskip 4\p@ \@plus2\p@ \@minus2\p@
1953 \def\@listi{%
1954 \leftmargin\leftmarginI
1955 \topsep 4\p@ \@plus2\p@ \@minus2\p@
1956 \parsep 2\p@ \@plus\p@ \@minus\p@
1957 \itemsep \parsep
1958 }%
1959 }%

1960 \def\footnotesize{%
1961 \@setfontsize\footnotesize\@viiipt{9.5pt}%
1962 \abovedisplayskip 6\p@ \@plus2\p@ \@minus4\p@
1963 \belowdisplayskip \abovedisplayskip
1964 \abovedisplayshortskip \z@ \@plus\p@
1965 \belowdisplayshortskip 3\p@ \@plus\p@ \@minus2\p@
1966 \def\@listi{%
1967 \leftmargin\leftmarginI
1968 \topsep 3\p@ \@plus\p@ \@minus\p@
1969 \parsep 2\p@ \@plus\p@ \@minus\p@
1970 \itemsep \parsep
1971 }%
1972 }%

1973 \def\scriptsize{%
1974 \@setfontsize\scriptsize\@viipt\@viiipt
1975 }%

```

```

1976 \def\tiny{%
1977 \@setfontsize\tiny\@vpt\@vipt
1978 }%
1979 \def\large{%
1980 \@setfontsize\large\@xiipt{14pt}%
1981 }%
1982 \def\Large{%
1983 \@setfontsize\Large\@xivpt{18pt}%
1984 }%
1985 \def\LARGE{%
1986 \@setfontsize\LARGE\@xviipt{22pt}%
1987 }%
1988 \def\huge{%
1989 \@setfontsize\huge\@xxpt{25pt}%
1990 }%
1991 \def\Huge{%
1992 \@setfontsize\Huge\@xxvpt{30pt}%
1993 }%

1994 \appdef\class@documenthook{%
1995 \twoside@sw{%
1996 \oddsidemargin -.4in
1997 \evensidemargin -.1in
1998 \marginparwidth 107pt
1999 }{%
2000 \oddsidemargin -.25in
2001 \evensidemargin -.25in
2002 \marginparwidth 30pt
2003 }%
2004 }%

2005 \marginparsep 6pt

2006 \topmargin -61pt

2007 \headheight 25pt
2008 \headsep 16pt

2009 \topskip 10pt

2010 \footskip 30pt

 Was: 57\baselineskip+ \topskip
2011 \appdef\set@pica@hook{%
2012 \textheight = 665.5\p@
2013 }%

2014 \textwidth42.5pc

2015 \columnsep 1.5pc
2016 \columnseprule 0pt

2017 \footnotesep 1pt
2018 \skip\footins 39pt plus 4pt minus 2pt
2019 \def\footnoterule{\kern-19pt\hrule width.5in\kern18.6pt}%

```

```

2020 \floatsep 12pt plus 2pt minus 2pt
2021 \textfloatsep 20pt plus 2pt minus 4pt
2022 \intextsep 12pt plus 2pt minus 2pt

2023 \dblfloatsep 12pt plus 2pt minus 2pt
2024 \dbltextfloatsep 20pt plus 2pt minus 4pt

2025 \@fptop 0pt plus 1fil
2026 \@fpsep 8pt plus 2fil
2027 \@fpbot 0pt plus 1fil
2028 \@dblfpptop 0pt plus 1fil
2029 \@dblfpsep 8pt plus 2fil
2030 \@dblfpbot 0pt plus 1fil

2031 \marginparpush 5pt

2032 \parskip 0pt plus 1pt
2033 \parindent 10pt
2034 \emergencystretch8\p@

2035 \partopsep 2pt plus 1pt minus 1pt

2036 \leftmargini 25pt
2037 \leftmarginii 22pt
2038 \leftmarginiii 18.7pt
2039 \leftmarginiv 17pt
2040 \leftmarginv 10pt
2041 \leftmarginvi 10pt

2042 \def\@listI{%
2043 \leftmargin\leftmargini
2044 \parsep 4\p@ plus2\p@ minus\p@
2045 \topsep 8\p@ plus2\p@ minus4\p@
2046 \itemsep 4\p@ plus2\p@ minus\p@
2047 }%

2048 \labelsep 4pt

2049 \def\@listii{%
2050 \leftmargin\leftmarginii
2051 \labelwidth\leftmarginii
2052 \advance\labelwidth-\labelsep
2053 \topsep 4\p@ plus2\p@ minus\p@
2054 \parsep 2\p@ plus\p@ minus\p@
2055 \itemsep \parsep
2056 }%

2057 \def\@listiii{%
2058 \leftmargin\leftmarginiii
2059 \labelwidth\leftmarginiii
2060 \advance\labelwidth-\labelsep
2061 \topsep 2\p@ plus\p@ minus\p@
2062 \parsep \z@
2063 \partopsep \p@ plus\z@ minus\p@
2064 \itemsep \topsep
2065 }%

```

```

2066 \def\@listiv{%
2067 \leftmargin\leftmarginiv
2068 \labelwidth\leftmarginiv
2069 \advance\labelwidth-\labelsep
2070 }%

2071 \def\@listv{%
2072 \leftmargin\leftmarginv
2073 \labelwidth\leftmarginv
2074 \advance\labelwidth-\labelsep
2075 }%

2076 \def\@listvi{%
2077 \leftmargin\leftmarginvi
2078 \labelwidth\leftmarginvi
2079 \advance\labelwidth-\labelsep
2080 }%

2081 %</10pt>

```

## 26 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.

```

2082 %<*11pt>

2083 \def\normalsize{%
2084 \@setfontsize\normalsize\@xipt{13.6}%
2085 \abovedisplayskip 11\p@ \@plus3\p@ \@minus6\p@
2086 \belowdisplayskip \abovedisplayskip
2087 \abovedisplayshortskip \abovedisplayskip
2088 \belowdisplayshortskip \abovedisplayskip
2089 \let\@listi\@listI
2090 }%

2091 \def\small{%
2092 \@setfontsize\small\@xpt\@xiipt
2093 \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
2094 \abovedisplayshortskip \z@ \@plus3\p@
2095 \belowdisplayshortskip 6\p@ \@plus3\p@ \@minus3\p@
2096 \def\@listi{\leftmargin\leftmargini
2097 \topsep 6\p@ \@plus2\p@ \@minus2\p@
2098 \parsep 3\p@ \@plus2\p@ \@minus\p@
2099 \itemsep \parsep
2100 }%
2101 \belowdisplayskip \abovedisplayskip
2102 }%

2103 \def\footnotesize{%
2104 \@setfontsize\footnotesize\@ixpt{11}%
2105 \abovedisplayskip 8\p@ \@plus2\p@ \@minus4\p@
2106 \abovedisplayshortskip \z@ \@plus\p@

```

```

2107 \belowdisplayskip 4\p@ \@plus2\p@ \@minus2\p@
2108 \def\@listi{\leftmargin\leftmargini
2109 \topsep 4\p@ \@plus2\p@ \@minus2\p@
2110 \parsep 2\p@ \@plus\p@ \@minus\p@
2111 \itemsep \parsep
2112 }%
2113 \belowdisplayskip \abovedisplayskip
2114 }%

2115 \def\scriptsize{%
2116 \@setfontsize\scriptsize\@viipt{9.5}%
2117 }%
2118 \def\tiny{%
2119 \@setfontsize\tiny\@viipt\@viipt
2120 }%
2121 \def\large{%
2122 \@setfontsize\large\@xiipt{14}%
2123 }%
2124 \def\Large{%
2125 \@setfontsize\Large\@xivpt{18}%
2126 }%
2127 \def\LARGE{%
2128 \@setfontsize\LARGE\@xviipt{22}%
2129 }%
2130 \def\huge{%
2131 \@setfontsize\huge\@xxpt{25pt}%
2132 }%
2133 \def\Huge{%
2134 \@setfontsize\Huge\@xxvpt{30pt}%
2135 }%

2136 %</11pt>

```

## 27 The 12pt class option: the 12pt module

The file 12pt.rtx is read in by the revtex4 document class if \@pointsize has the value 12.

```

2137 %<*12pt>

2138 \def\normalsize{%
2139 \@setfontsize\normalsize\@xiipt{14pt}%
2140 \abovedisplayskip 12\p@ \@plus3\p@ \@minus7\p@
2141 \belowdisplayskip \abovedisplayskip
2142 \abovedisplayskip \z@ plus3\p@
2143 \belowdisplayskip 6.5\p@ \@plus3.5\p@ \@minus3\p@
2144 \let\@listi\@listI
2145 }%

2146 \def\small{%
2147 \@setfontsize\small\@xipt{14.5pt}%

```

```

2148 \abovedisplayskip 811\p@ \@plus3\p@ \@minus6\p@
2149 \belowdisplayskip \abovedisplayskip
2150 \abovedisplayshortskip \z@ \@plus3\p@
2151 \belowdisplayshortskip 6.5\p@ \@plus3.5\p@ \@minus3\p@
2152 \def\@listi{%
2153 \leftmargin\leftmargini
2154 \topsep 9\p@ \@plus3\p@ \@minus5\p@
2155 \parsep 4.5\p@ \@plus2\p@ \@minus\p@
2156 \itemsep \parsep
2157 }%
2158 }%

Same baselineskip as \small ?

2159 \def\footnotesize{%
2160 \@setfontsize\footnotesize\@xpt{14.5pt}%
2161 \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
2162 \belowdisplayskip \abovedisplayskip
2163 \abovedisplayshortskip \z@ \@plus3\p@
2164 \belowdisplayshortskip 6\p@ \@plus3\p@ \@minus3\p@
2165 \def\@listi{%
2166 \leftmargin\leftmargini
2167 \topsep 6\p@ \@plus2\p@ \@minus2\p@
2168 \parsep 3\p@ \@plus2\p@ \@minus\p@
2169 \itemsep \parsep
2170 }%
2171 }%

2172 \def\scriptsize{%
2173 \@setfontsize\scriptsize\@viiipt{9.5pt}%
2174 }%
2175 \def\tiny{%
2176 \@setfontsize\tiny\@viipt{7pt}%
2177 }%
2178 \def\large{%
2179 \@setfontsize\large\@xivpt{18pt}%
2180 }%
2181 \def\Large{%
2182 \@setfontsize\Large\@xviipt{22pt}%
2183 }%
2184 \def\LARGE{%
2185 \@setfontsize\LARGE\@xxpt{25pt}%
2186 }%
2187 \def\huge{%
2188 \@setfontsize\huge\@xxv{30pt}%
2189 }%
2190 \let\Huge=\huge
2191 %</12pt>

```

## 28 Page parameters

This code is common to both 11pt and 12pt.

```
2192 %<*11pt|12pt>
2193 \appdef\class@documenthook{%
2194 \twoside@sw{%
2195 \oddsidemargin .25in
2196 \evensidemargin -.25in
2197 \marginparwidth 60pt
2198 }{%
2199 \oddsidemargin 0pt
2200 \evensidemargin 0pt
2201 \marginparwidth 44pt
2202 }%
2203 }%

2204 \marginparsep 10pt

2205 \topmargin -37pt

2206 \headheight 12pt
2207 \headsep 25pt

2208 \topskip 10pt

2209 \footskip 30pt

2210 \appdef\set@pica@hook{%
2211 \@ifxundefined\tightenlines@sw{\@booleanfalse\tightenlines@sw}{}%
2212 \textheight=665.5\p@
2213 \tightenlines@sw{}{%
2214 \def\baselinestretch{1.655}%
2215 }%
2216 }%

2217 \textwidth 468pt

2218 \columnsep 10pt
2219 \columnseprule 0pt

2220 \footnotesep 1pt
2221 \skip\footins 25.25pt plus 4pt minus 2pt
2222 \def\footnoterule{\kern-5.25pt\hrule width.5in\kern4.85pt}

2223 \floatsep 14pt plus 2pt minus 4pt
2224 \textfloatsep 20pt plus 2pt minus 4pt
2225 \intextsep 14pt plus 4pt minus 4pt

2226 \dblfloatsep 14pt plus 2pt minus 4pt
2227 \dbltextfloatsep 20pt plus 2pt minus 4pt

2228 \@fptop 0pt plus 1fil
2229 @fpsep 10pt plus 2fil
2230 @fpbot 0pt plus 1fil
2231 @dblftop 0pt plus 1fil
2232 @dblfpsep 10pt plus 2fil%
2233 @dblfpbot 0pt plus 1fil
```

```

2234 \marginparpush 7pt
2235 \parskip 0pt plus 1pt
2236 \parindent 15pt
2237 \emergencystretch8\p@
2238 \partopsep 3pt plus 2pt minus 2pt

2239 \leftmargini 30pt
2240 \leftmarginii 26pt
2241 \leftmarginiii 22pt
2242 \leftmarginiv 20pt
2243 \leftmarginv 12pt
2244 \leftmarginvi 12pt

2245 \def\@listI{\leftmargin\leftmargini \parsep 5\p@ plus2.5\p@ minus\p@
2246 \topsep 10\p@ plus4\p@ minus6\p@
2247 \itemsep 5\p@ plus2.5\p@ minus\p@
2248 }%

2249 \labelsep 6pt

2250 \def\@listii{\leftmargin\leftmarginii
2251 \labelwidth\leftmarginii\advance\labelwidth-\labelsep
2252 \topsep 5\p@ plus2.5\p@ minus\p@
2253 \parsep 2.5\p@ plus\p@ minus\p@
2254 \itemsep \parsep
2255 }%

2256 \def\@listiii{\leftmargin\leftmarginiii
2257 \labelwidth\leftmarginiii\advance\labelwidth-\labelsep
2258 \topsep 2.5\p@ plus\p@ minus\p@
2259 \parsep \z@ \partopsep \p@ plus\z@ minus\p@
2260 \itemsep \topsep
2261 }%

2262 \def\@listiv{\leftmargin\leftmarginiv
2263 \labelwidth\leftmarginiv\advance\labelwidth-\labelsep
2264 }%

2265 \def\@listv{\leftmargin\leftmarginv
2266 \labelwidth\leftmarginv\advance\labelwidth-\labelsep
2267 }%

2268 \def\@listvi{\leftmargin\leftmarginvi
2269 \labelwidth\leftmarginvi\advance\labelwidth-\labelsep
2270 }%

2271 %</11pt|12pt>

```

## 29 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 REV<sub>T</sub><sub>E</sub><sub>X</sub> document class. (Other societies can customize REV<sub>T</sub><sub>E</sub><sub>X</sub> 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 L<sup>A</sup>T<sub>E</sub>X developers: It would be an improvement in L<sup>A</sup>T<sub>E</sub>X to \let\AtEndOfClass to something like \@firstofone. This change would be effected in \@onefilewithoptions.

```
2272 %<*aps>
```

## 29.1 Defend Against Forseeable Errors

Protect this file from being read in by anything but REVT<sub>E</sub>X.

```
2273 \ifx\undefined\substyle@ext
2274 \def\@tempa{%
2275 \endinput
2276 \GenericWarning{I must be read in by REVTEX! (Bailing out)}%
2277 }%
2278 \expandafter\else
2279 \def\@tempa{}%
2280 \expandafter\fi\@tempa
```

## 29.2 Abbreviations

The following macros constitute typing shortcuts for certain journal names.

```
2281 \def\ao{Appl.\ Opt.\ }
2282 \def\ap{Appl.\ Phys.\ }
2283 \def\apl{Appl.\ Phys.\ Lett.\ }
2284 \def\apj{Astrophys.\ J.\ }
2285 \def\bell{Bell Syst.\ Tech.\ J.\ }
2286 \def\jqe{IEEE J.\ Quantum Electron.\ }
2287 \def\assp{IEEE Trans.\ Acoust.\ Speech Signal Process.\ }
2288 \def\aprop{IEEE Trans.\ Antennas Propag.\ }
2289 \def\mtt{IEEE Trans.\ Microwave Theory Tech.\ }
2290 \def\iovs{Invest.\ Ophthalmol.\ Vis.\ Sci.\ }
2291 \def\jcp{J.\ Chem.\ Phys.\ }
2292 \def\jmo{J.\ Mod.\ Opt.\ }
2293 \def\josa{J.\ Opt.\ Soc.\ Am.\ }
2294 \def\josaa{J.\ Opt.\ Soc.\ Am.\ A }
2295 \def\josab{J.\ Opt.\ Soc.\ Am.\ B }
2296 \def\jpp{J.\ Phys.\ (Paris) }
2297 \def\nat{Nature (London) }
2298 \def\oc{Opt.\ Commun.\ }
2299 \def\ol{Opt.\ Lett.\ }
2300 \def\pl{Phys.\ Lett.\ }
2301 \def\pra{Phys.\ Rev.\ A }
2302 \def\prb{Phys.\ Rev.\ B }
2303 \def\prc{Phys.\ Rev.\ C }
2304 \def\prd{Phys.\ Rev.\ D }
```

```

2305 \def\pre{Phys.\ Rev.\ E }
2306 \def\prl{Phys.\ Rev.\ Lett.\ }
2307 \def\rmp{Rev.\ Mod.\ Phys.\ }
2308 \def\pspie{Proc.\ Soc.\ Photo-Opt.\ Instrum.\ Eng.\ }
2309 \def\sjqe{Sov.\ J.\ Quantum Electron.\ }
2310 \def\vr{Vision Res.\ }

```

## 29.3 APS Setup

Here we define the default procedures for APS journals. Individual APS journals may override these definitions.

### 29.3.1 Title block

The specifics of the title block. Apply to all APS journals; individual journals may override these settings.

`\titlepage`

```

2311 \renewenvironment{titlepage}{%
2312 \let\wastwocol@sw\twocolumn@sw
2313 \onecolumngrid
2314 \newpage
2315 \thispagestyle{titlepage}%
2316 \c@page\z@% article sets this to one not zero???
2317 }{%
2318 \wastwocol@sw{\twocolumngrid}{\newpage}%
2319 }%

```

`\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.

```

2320 \def\frontmatter@abstractheading{%
2321 \preprintsty@sw{%
2322 \begin{center}\large\abstractname\end{center}%
2323 \vspace{-1pc}%
2324 }{}%
2325 }%

```

`\frontmatter@abstractwidth` All APS journals set the abstract to the same relative width.

```

2326 \def\frontmatter@abstractwidth{.75\textwidth}

```

`\frontmatter@abstractfont` All APS journals set the abstract body the same way.

```

2327 \def\frontmatter@abstractfont{%
2328 \small
2329 \parskip3\p@\relax
2330 }%

```

`\footinbib@sw` All APS journals except RMP invoke the `footinbib` option.

```

2331 \@ifxundefined\footinbib@sw{\@booleantrue\footinbib@sw}{}%

```

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.

```
2332 \appdef\class@documenthook{%
2333 \preprintsty@sw{%
2334 \@ifxundefined\titlepage@sw{\@booleantrue\titlepage@sw}{}%
2335 \def\baselinestretch{1.5}%
2336 \def\frontmatter@abstractwidth{\textwidth}%
2337 \def\frontmatter@affiliationfont{\it}%
2338 \let\section\section@preprintsty
2339 \let\subsection\subsection@preprintsty
2340 \let\subsubsection\subsubsection@preprintsty
2341 }{}%
2342 }%
```

`\frontmatter@authorformat` All APS journals set the author list the same.

```
2343 \def\frontmatter@authorformat{%
2344 \skip@\@flushglue
2345 \@flushglue\z@ plus.3\hsize\relax
2346 \centering
2347 \baselineskip3ex
2348 \parskip\z@skip
2349 \@flushglue\skip@
2350 }%
```

`\frontmatter@above@affiliation` The default amount of space above affiliation. Journals will override this definition.

```
2351 \def\frontmatter@above@affiliation{\smallskip}%
```

`\frontmatter@affiliationfont` All APS journals set the affiliation the same.

```
2352 \def\frontmatter@affiliationfont{\small\it}%
```

Set up the default APS style for title block authors and affiliations.

```
2353 \@ifxundefined\groupauthors@sw{%
2354 \clo@groupedaddress
2355 }{}%
```

`\frontmatter@setup` All APS journals set the title page the same.

```
2356 \def\frontmatter@setup{\normalfont\centering}%
```

`\frontmatter@title@produce` All APS journals set the article title the same.

```
2357 \def\frontmatter@title@produce{%
2358 \begingroup\large\bfseries\@title\par\endgroup
2359 \addvspace{2\baselineskip}%
2360 }%
```

`\frontmatter@makefnmark` All APS journals share this procedure for setting the titlepage footnote text.

```
2361 \def\frontmatter@makefnmark{\@textsuperscript{\normalfont\@thefnmark}}%
```

```

\frontmatter@RRAPformat All APS journals use the same format for the “Received, Revised, etc.” block on the title
page.
2362 \def\frontmatter@RRAPformat#1{%
2363 \begingroup
2364 \centering\parskip.5ex\relax
2365 \everypar{\hbox\bgroup(\@gobble@leavemode@uppercase}%
2366 \def\par{\@ifvmode{\@unskip)\egroup\@par}}%
2367 #1\par
2368 \endgroup
2369 }%
2370 \def\punct@RRAP{;\egroup\ \hbox\bgroup}%
2371 \def\@gobble@leavemode@uppercase#1#2{\expandafter\MakeTextUppercase}%

\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.
2372 \def\ps@titlepage{%
2373 \def\@oddhead{%
2374 \hfill
2375 \produce@preprints\@preprint
2376 }%
2377 \let\@evenhead\@oddhead
2378 \def\@oddfont{%
2379 \hb@xt@\z@{\byrevtex\hss}%
2380 \hfil
2381 \preprintsty@sw{\thepage}{}%
2382 \quad\checkindate
2383 \hfil
2384 }%
2385 \let\@evenfoot\@oddfont
2386 }%
2387 \def\byrevtex{\byrevtex@sw{Typeset by REV\TeX}{}}%

\produce@preprints
2388 \def\produce@preprints#1{%
2389 \preprintsty@sw{%
2390 \vtop to \z@{%
2391 \def\baselinestretch{1}%
2392 \small
2393 \let\preprint\preprint@count
2394 \count@\z@#1\@ifnum{\count@>\tw@}{%
2395 \hbox{%
2396 \let\preprint\preprint@hlist
2397 #1\setbox\z@\lastbox
2398 }%
2399 }{%
2400 \let\preprint\preprint@cr
2401 \halign{\hfil##\cr#1\crr}%
2402 \par
2403 \vss

```

```

2404 }%
2405 }%
2406 }{}%
2407 }%
2408 \def\preprint@cr#1{#1\cr}%
2409 \def\preprint@count#1{\advance\count@\@ne}%
2410 \def\preprint@hlist#1{#1\hbox{, }}%

```

\section@preprintsty Here are the formatting procedures specific to the preprint style; the only difference is  
 \subsection@preprintsty that the heads are flush left instead of centered.

```

\subsubsection@preprintsty 2411 \def\section@preprintsty{%
2412 \@startsection
2413 {section}%
2414 {1}%
2415 {\z@}%
2416 {0.8cm \@pluslex \@minus .2ex}%
2417 {0.5cm \@pluslex \@minus .2ex}%
2418 {%
2419 \normalfont\small\bfseries
2420 % \centering
2421 \MakeTextUppercase
2422 }%
2423 }%

2424 \def\subsection@preprintsty{%
2425 \@startsection
2426 {subsection}%
2427 {2}%
2428 {\z@}%
2429 {.8cm \@pluslex \@minus .2ex}%
2430 {.5cm \@pluslex \@minus .2ex}%
2431 {%
2432 \normalfont\small\bfseries
2433 % \centering
2434 }%
2435 }%

2436 \def\subsubsection@preprintsty{%
2437 \@startsection
2438 {subsubsection}%
2439 {3}%
2440 {\z@}%
2441 {.8cm \@pluslex \@minus .2ex}%
2442 {.5cm \@pluslex \@minus .2ex}%
2443 {%
2444 \normalfont\small\itshape
2445 % \centering
2446 }%
2447 }%

```

Invoke `bibnote` option, if it has not yet been set.

```
2448 \@ifxundefined\author@note{\def\author@note{\rtx@bibnote}}{}}%
```

### 29.3.2 Table of Contents

The toc will itself make an entry in the toc, but we temporarily turn off toc formatting for the duration.

```
2449 \def\@pnumwidth{1.55em}
2450 \def\@tocrmarg {2.55em}
2451 \def\@dotsep{4.5}
2452 \setcounter{tocdepth}{3}

2453 \def\tableofcontents{%
2454 \addtocontents{toc}{\string\tocdepth@munge}%
2455 \print@toc{toc}%
2456 \addtocontents{toc}{\string\tocdepth@restore}%
2457 }%

2458 \def\tocdepth@munge{%
2459 \let\l@section@saved\l@section
2460 \let\l@section\@gobble@tw@
2461 }%
2462 \def\@gobble@tw@#1#2{}%

2463 \def\tocdepth@restore{%
2464 \let\l@section\l@section@saved
2465 }%

2466 \def\l@part#1#2{\addpenalty{\@secpenalty}%
2467 \advvspace{2.25em plus\p@}%
2468 \begingroup
2469 \@tempdima 3em %
2470 \parindent \z@ \rightskip \@pnumwidth %
2471 \parfillskip -\@pnumwidth
2472 {\large \bf %
2473 \leavevmode %
2474 #1\hfil \hb@xt@\@pnumwidth{\hss #2}}\par
2475 \nobreak %
2476 \endgroup
2477 }%

2478 \def\l@section#1#2{%
2479 \addpenalty{\@secpenalty}%
2480 \advvspace{1.0em plus\p@}%
2481 \@tempdima 3.0em %
2482 \begingroup
2483 \parindent \z@ \rightskip \@pnumwidth
2484 \parfillskip -\@pnumwidth
2485 \bf %
2486 \leavevmode %
2487 \advance\leftskip\@tempdima %
2488 \hskip -\leftskip %
2489 #1\nobreak\hfil \nobreak\hb@xt@\@pnumwidth{\hss #2}\par
```

```

2490 \endgroup
2491 }%

2492 \def\l@section{\@dottedtocline{2}{3.0em}{2.0em}}
2493 \def\l@subsection{\@dottedtocline{3}{5.0em}{1.5em}}
2494 \def\l@paragraph{\@dottedtocline{4}{6.5em}{1.5em}}
2495 \def\l@subparagraph{\@dottedtocline{5}{8.0em}{1.5em}}

2496 \def\listoffigures{\print@toc{lof}}%
2497 \def\l@figure{\@dottedtocline{1}{1.5em}{2.3em}}

2498 \def\listoftables{\print@toc{lot}}%
2499 \let\l@table\l@figure

```

### 29.3.3 Table alignment style

```

\tableft@skip@float All APS publications have the same table specification: Scotch rules above and below,
\tabmid@skip@float centered in column.
\tabright@skip@float 2500 \def\tableft@skip@float{\@flushglue}%
\array@row@pre@float 2501 \def\tabmid@skip@float{\@flushglue}%
\array@row@pst@float 2502 \def\tabright@skip@float{\@flushglue}%
2503 \def\array@row@pre@float{\hline\hline\noalign{\vskip\doublerulesep}}%
2504 \def\array@row@pst@float{\noalign{\vskip\doublerulesep}\hline\hline}%

```

### 29.3.4 Appendix

```

\appendix
\@hangfrom@appendix 2505 \appdef\appendix{%
\hangfrom@appendix 2506 \let\@hangfrom@section\@hangfrom@appendix
\@appendixcntformat 2507 \let\@hangfrom@section\@hangfrom@appendix
2508 \let\@sectioncntformat\@appendixcntformat
2509 }%
2510 \def\@hangfrom@appendix#1#2{%
2511 #1\@ifempty{#2}{}{\quad#2}%
2512 }%
2513 \def\@hangfrom@appendix#1#2{%
2514 #2%
2515 }%
2516 \def\@appendixcntformat#1{\appendixname\ \csname the#1\endcsname}%

```

### 29.3.5 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 applies generally to any REV<sub>T</sub>E<sub>X</sub> 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 incollection 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: jtitt-x` (No article title);
11. JOURNAL NAME FONT: `r: jtitt-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 PARENTHESSES: `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,x2%: Maximum of 12 authors
% ,m10,m2%: Minimum of 12 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)
% ,jtit-x%: No article title
% ,jttl-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
% ,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 29.5).

`\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. We also nip inside natbib and set up for sort&compression.

The journal substyles can override these choices.

Note that setting `\NAT@sort` at this late hour is not effective. You have to give natbib the relevant options at load time.

```

2517 \@ifpackageloaded{natbib}{%
2518 \bibpunct{[]{}{,}{n}{}{,}}%
2519 %\def\NAT@sort{2}%
2520 }{}%

```

`\bibsection` We define the sectioning command to use when starting the bibliography and gently coax natbib into using the formatting procedures appropriate to the APS.

`\@bibsetup` This way of setting up the bibliography automatically sets the label width based on the largest number used within the bibliography.

`\bibfont`  
`\@biblabel`

In `\bibfont` is the class's default `\place@bibnumber`. If neither the document nor the journal substyle has made a selection at that late moment, the following selection will prevail and avoid this procedure being undefined.

A journal substyle may override these settings.

```

2521 \def\bibsection{%
2522 \@ifx@empty\refname{%
2523 \par
2524 }{%
2525 \section*{\refname}%
2526 }%
2527 }%
2528 \def\class@bibsetup#1{\NAT@bibsetup{\ref{LastBibItem}}}%
2529 \let\bibpreamble\@empty
2530 \def\bibfont{%
2531 \bibsep\z@\relax
2532 \let\NAT@bibsetup\@bibsetup
2533 \let\@bibsetup\class@bibsetup
2534 \@ifxundefined\place@bibnumber{%
2535 \let\@biblabel\place@bibnumber@inl
2536 }{%
2537 \let\@biblabel\place@bibnumber
2538 }%
2539 \def\newblock{\ }%
2540 }%

```

### 29.3.6 Index

FIXME: the following call to `\twocolumn` appears wrong if we were in two-column grid.

```

2541 \newenvironment{theindex}{%
2542 \let\wastwocol@sw\twocolumn@sw
2543 \columnseprule \z@
2544 \columnsep 35\p@
2545 \c@secnumdepth-\maxdimen
2546 \onecolumngrid
2547 \section{\indexname}%
2548 \thispagestyle{plain}%
2549 \parindent\z@
2550 \parskip\z@ plus.3\p@\relax
2551 \let\item\@idxitem
2552 \wastwocol@sw{\twocolumngrid}{}%
2553 }{%
2554 \onecolumngrid
2555 }%
2556 %
2557 \def\@idxitem{\par\hangindent 40\p@}
2558 %
2559 \def\subitem{\par\hangindent 40\p@ \hspace*{20\p@}}
2560 %

```

```

2561 \def\subsubitem{\par\hangindent 40\p@ \hspace*{30\p@}}
2562 %
2563 \def\indexspace{\par \vskip 10\p@ plus5\p@ minus3\p@\relax}

```

## 29.4 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.

```

2564 \def\journal@pra{pra}%
2565 \def\journal@prb{prb}%
2566 \def\journal@prc{prc}%
2567 \def\journal@prd{prd}%
2568 \def\journal@pre{pre}%
2569 \def\journal@prl{prl}%
2570 \def\journal@prstab{prstab}%
2571 \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.

### 29.4.1 pra

```

2572 \@ifx{\@journal\journal@pra}{%

```

End of pra code.

```

2573 }{}%

```

### 29.4.2 prb

```

2574 \@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 and nip inside natbib and set up for sort&compression.

```

2575 \@ifxundefined\bibnotes@sw{\@booleantrue\bibnotes@sw}{}%
2576 \bibpunct{}{}{,}{s}{}{,}%
2577 \def\NAT@sort{2}%
2578 \def\onlinecite#1{\begingroup\let\@cite\NAT@citenum\citealp{#1}\endgroup}%

```

Invoke superbib option if the document has made no selection of its own.

```

2579 \appdef\class@documenthook{%
2580 \@ifxundefined\place@bibnumber{%
2581 \def\place@bibnumber{\place@bibnumber@sup}%
2582 }{}%
2583 }%

```

End of prb code.

```
2584 }{}%
```

### 29.4.3 prc

```
2585 \@ifx{\@journal\journal@prc}{%
```

End of prc code.

```
2586 }{}%
```

### 29.4.4 prd

```
2587 \@ifx{\@journal\journal@prd}{%
```

End of prd code.

```
2588 }{}%
```

### 29.4.5 pre

```
2589 \@ifx{\@journal\journal@pre}{%
```

End of prd code.

```
2590 }{}%
```

### 29.4.6 prl

```
2591 \@ifx{\@journal\journal@prl}{%
```

In PRL, the default is the bibnotes option, and the Acknowledgments and References sections have no head.

```
2592 \@ifxundefined\bibnotes@sw{\@booleantrue\bibnotes@sw}{}%
```

```
2593 \let\acknowledgmentsname\@empty
```

```
2594 \let\refname\@empty
```

Implement length checking. Use the mathtime package, plus whatever other processing is required to make the formatted output be true to the metrics of the journal.

Note that we execute \RequirePackage at \AtBeginDocument time; this timing can be problematic for some packages: they are not used to being read in so late.

```
2595 \appdef\class@documenthook{%
```

```
2596 \lengthcheck@sw{%
```

```
2597 \Requirepackage{mathtime}%
```

```
2598 }{}%
```

```
2599 }%
```

A PRL does not have numbered sections.

```
2600 \c@secnumdepth=-\maxdimen
```

Note: we defer this code until after type size file is read in.

```
2601 \appdef\set@typesize@hook{%
```

```
2602 \@ifnum{\@pointsize=10\relax}{%
```

```
2603 \def\normalsize{%
```

```
2604 \setfontsize\normalsize\@xpt\@xipt
```

```
2605 \abovedisplayskip 10\p@ \@plus2\p@ \@minus5\p@
```

```
2606 \belowdisplayskip \abovedisplayskip
```

```
2607 \abovedisplayshortskip \abovedisplayskip
```

```
2608 \belowdisplayshortskip \abovedisplayskip
```

```

2609 \let\@listi\@listI
2610 }%
2611 }{}%
2612 }%
2613 \appdef\set@pica@hook{%
2614 \@ifnum{\@pointsize=10\relax}{%
2615 \textheight = 694.0\p@
2616 % \textheight = 55\baselineskip
2617 % \advance\textheight by \topskip
2618 }{}%
2619 }%

```

End of prl code.

```
2620 }{}%
```

### 29.4.7 prstab

```
2621 \@ifx{\@journal\journal@prstab}{%
```

End of prstab code.

```
2622 }{}%
```

### 29.4.8 rmp

Read in the code from a file.

```
2623 \@ifx{\@journal\journal@rmp}{\input{\@journal\substyle@ext}}{}%
```

## 29.5 Establish APS Defaults

`\place@bibnumber` We install code that will select the presentation for `\bibitems` and govern the `BIBTEX`  
`\@bibstyle` processing. If the user has not selected any related option and if the journal substyle also has not, then the `aps` option chooses these defaults.

```

2624 \appdef\class@documenthook{%
2625 \@ifundefined\place@bibnumber{%
2626 \def\place@bibnumber{\place@bibnumber@inl}%
2627 }{}%
2628 \@ifundefined\@bibstyle{%
2629 \def\@bibstyle{apsrev}%
2630 }{}%
2631 }%

```

```
2632 %</aps>
```

## 30 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.

```
2633 %<*rmp>
```

Protect this file from being read in by anything but REVTeX.

```
2634 \ifx\undefined\substyle@ext
2635 \def\@tempa{%
2636 \endinput
2637 \GenericWarning{I must be read in by REVTeX! (Bailing out)}%
2638 }%
2639 \expandafter\else
2640 \def\@tempa{ }%
2641 \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.

```
2642 \@ifx@empty\@journal{%
2643 \class@warn{I have to read in the aps substyle first!}%
2644 \endinput
2645 \def\@society{aps}\def\@journal{rmp}%
2646 \expandafter\input\expandafter{\@society\substyle@ext}%
2647 }{ }%
```

### 30.1 Frontmatter

\frontmatter@setup

```
2648 \def\frontmatter@setup{\normalfont\raggedright\sffamily}%
```

\frontmatter@title@produce

```
2649 \def\frontmatter@title@produce{%
2650 \begingroup\Large\bfseries\@title\par\endgroup
2651 \addvspace{8pt}%
2652 }%
```

\frontmatter@authorformat

Set the rag to a milder value, because we want to do true ragged right typesetting, as opposed to the L<sup>A</sup>T<sub>E</sub>X default, which gives very poor results.

```
2653 \def\frontmatter@authorformat{%
2654 \preprintsty@sw{\vskip0.5pc\relax}{ }%
2655 \@tempskipa\@flushglue
2656 \@flushglue\z@ plus50\p@\relax
2657 \raggedright\advance\leftskip.5in\relax
2658 \@flushglue\@tempskipa
2659 \parskip\z@skip
2660 }%
```

Frontmatter@affiliationfont

```
2661 \def\frontmatter@affiliationfont{\small\slshape\selectfont}%
```

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.

```
2662 \@ifxundefined\groupauthors@sw{%
2663 \clo@groupedaddress
2664 }{ }%
```

`\frontmatter@RRAPformat` Note: in RMP, if we are not in preprint mode, the date will not be produced.

```
2665 \def\frontmatter@RRAPformat#1{%
2666 \begingroup
2667 \small
2668 \raggedright\advance\leftskip.5in\relax
2669 \parskip.5ex\relax
2670 \everypar{\hbox\bgroup(\@gobble@leavemode@uppercase)}%
2671 \def\par{\@ifvmode{}{\unskip)\egroup\@par}}%
2672 \preprintsty@sw{\let\@date\@empty}%
2673 #1\par
2674 \endgroup
2675 }%
```

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

```
2676 \def\frontmatter@abstractheading{%
2677 \preprintsty@sw{%
2678 \begingroup
2679 \centering\large\abstractname\par
2680 \endgroup
2681 \vspace{.5pc}%
2682 }{}%
2683 }%
```

`\frontmatter@abstractfont`

```
2684 \def\frontmatter@abstractfont{%
2685 \footnotesize
2686 \hsize\columnwidth
2687 \leftskip=0.5in
2688 \rightskip=\leftskip
2689 \parindent\z@
2690 %\hsize5.5in
2691 }%
```

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

```
ontmatter@postabstractspace 2692 \def\frontmatter@preabstractspace{2.5pc}
2693 \def\frontmatter@postabstractspace{2.0pc}
```

FIXME: Not done: PACS.

## 30.2 General Text

If not in preprint mode, set the type size to 10/12 point.

```
2694 \appdef\set@typesize@hook{%
2695 \@ifxundefined\preprintsty@sw{}{}%
2696 \preprintsty@sw{}{}%
2697 \def\normalsize{%
2698 \@setsize\normalsize{12pt}\xpt\xpt
2699 \abovedisplayskip 10\p@ plus2\p@ minus5\p@
2700 \belowdisplayskip \abovedisplayskip
```



```

2701 \abovedisplayshortskip \abovedisplayskip
2702 \belowdisplayshortskip \abovedisplayskip
2703 \let\@listi\@listI
2704 }%
2705 }%
2706 }%
2707 }%

```

Footnote mods:

```

2708 \footnotesep 9.25pt
2709 \skip\footins 36pt plus 4pt minus 2pt
2710 \def\footnoterule{\kern-13pt\hrule width.5in\kern15.6pt}%

```

### 30.3 Sectioning

```

2711 \def\thepart{\Roman{part}} %
2712 \def\thesection{\Roman{section}}
2713 \def\p@section{}
2714 \def\thesubsection{\Alph{subsection}}
2715 \def\p@subsection{\thesection.}
2716 \def\thesubsubsection{\arabic{subsubsection}}
2717 \def\p@subsubsection{\thesection.\thesubsection.}
2718 \def\p@paragraph{\thesection.\thesubsection.\thesubsubsection.}
2719 \def\theparagraph{\alph{paragraph}}
2720 \def\thesubparagraph{\theparagraph.\arabic{subparagraph}}

2721 \def\section{%
2722 \@startsection{section}{1}{\z@}{0.8cm plus1ex minus.2ex}{0.4cm plus1ex minus.2ex}{
2723 {%
2724 \small\sffamily\bfseries\selectfont
2725 \raggedright
2726 \parindent\z@
2727 \MakeTextUppercase % Implicit #1
2728 }%
2729 }%
2730 \def\subsection{%
2731 \@startsection{subsection}{2}{\z@}{0.8cm plus1ex minus.2ex}{0.4cm plus1ex minus.2
2732 {%
2733 \small\sffamily\bfseries
2734 \raggedright
2735 \parindent\z@
2736 }%
2737 }%
2738 \def\subsubsection{%
2739 \@startsection{subsubsection}{3}{\z@}{.8cm plus1ex minus.2ex}{0.4cm plus1ex minus
2740 {%
2741 \small\sffamily\selectfont
2742 \raggedright
2743 \parindent\z@
2744 }%
2745 }%

```

```

2746 \def\paragraph{%
2747 \startsection{paragraph}{4}{\z@}{.8cm plus1ex minus.2ex}{0.4cm plus1ex minus.2ex}
2748 {%
2749 \small\slshape\selectfont
2750 \raggedright
2751 \parindent\z@
2752 }%
2753 }%
2754 \def\subparagraph{%
2755 \startsection{subparagraph}{4}{\parindent}{3.25ex plus1ex minus.2ex}{-1em}%
2756 {\normalsize\bfseries\selectfont}%
2757 }%
2758 \def\@secntformat#1{\csname the#1\endcsname.\ }%
2759 %
2760 \setcounter{tocdepth}{4}% FIXME: has no effect

```

```

\appendix
\@hangfrom@appendix 2761 \appdef\appendix{%
\@hangfroms@appendix 2762 \let\@hangfrom@section\@hangfrom@appendix
\@appendixcntformat 2763 \let\@hangfroms@section\@hangfroms@appendix
2764 \let\@sectioncntformat\@appendixcntformat
2765 }%
2766 \def\@hangfrom@appendix#1#2{%
2767 #1\@ifempty{#2}{}{\:\ #2}%
2768 }%
2769 \def\@hangfroms@appendix#1#2{%
2770 #1\appendixname\@ifempty{#2}{}{\:\ #2}%
2771 }%
2772 \def\@appendixcntformat#1{\appendixname\ \csname the#1\endcsname}%

```

### 30.4 Figure and Table Caption Formatting

```

\@makecaption
2773 \setlength\belowcaptionskip{2\p@}
2774 \long\def\@makecaption#1#2{%
2775 \vskip\abovecaptionskip
2776 \vbox{%
2777 \small\rmfamily
2778 % \hsize\@capwidth
2779 \noindent
2780 #1\nobreak\hskip.5em plus.2em\ignorespaces#2\par
2781 }%
2782 \vskip\belowcaptionskip
2783 }%

```

### 30.5 Citations and Bibliography

Customize REV<sub>T</sub>E<sub>X</sub> for the journal substyle; this task requires three components: a BIB<sub>T</sub>E<sub>X</sub> .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.

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: jnr1st (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 incollection 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: jtitt-x (No article title);
19. JOURNAL TITLE FONT: r: jtitt-rm (Journal title normal);
20. TECHNICAL REPORT TITLE: b: trtit-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,x2%: Maximum of 12 authors
% ,m10,m2%: Minimum of 12 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
% ,jttl-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
% ,injn%: 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
% ,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
%
```

```

2784 \appdef\class@documenthook{%
2785 \@ifxundefined\@bibstyle{%
2786 \def\@bibstyle{apsrmp}%
2787 }{}%
2788 }%
```

`\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. We also nip inside `natbib` and set up for `sort&compression`.

```

2789 \@ifpackageloaded{natbib}{%
2790 \bibpunct{({})}{,}{a}{}{,}%
2791 \def\NAT@sort{0}%
2792 }{}%
```

`\bibsection` We define the sectioning command to use when starting the bibliography.

`\@bibsetup` In `\bibfont` is the journal substyle's definition of `\@biblabel`.

```

\bibfont 2793 \def\bibsection{\section*{\refname}}%
\@biblabel 2794 \let\bibpreamble\@empty
\@bibsetup@rmp 2795 \def\bibfont{%
2796 \bibsep\z@\relax
2797 \let\@bibsetup\@bibsetup@rmp
2798 \let\@biblabel\@gobble
2799 \def\newblock{\ }%
2800 }%
2801 \def\@bibsetup@rmp#1{%
2802 \leftmargin10\p@
2803 \labelwidth\z@
2804 \labelsep\z@
2805 \itemindent-\leftmargin
2806 \parsep\z@
2807 \topsep\z@
2808 \itemsep\z@
2809 }%
```

`\footinbib@sw` Footnotes in bibliography are inconsistent with author-year references, and are particularly nast under `natbib`: the package will automatically change to numbered references if any `\bibitem` commands lack the optional argument. Also, all APS journals except RMP invoke the `footinbib` option. Therefore, we must uninvoke it now, even if invoked by the document.

```
2810 \@ifxundefined\footinbib@sw{\}%
2811 \footinbib@sw{\}%
2812 \class@warn{\}%
2813 Footnotes in bibliography are incompatible with RMP.^J%
2814 Undoing the footinbib option.
2815 }%
2816 }{\}%
2817 }%
2818 \@booleanfalse\footinbib@sw
```

### 30.6 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 (4.5), 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.

```
2819 \def\toc@@font{\%
2820 \footnotesize\rmfamily
2821 \def\{\space\ignorespaces}\%
2822 }%
2823 \def\@dotsep{5.5pt}\%
```

`\l@section` Determine which TOC elements are automatically indented.

```
2824 \def\l@section{\%
2825 \l@sections\section}\% Implicit #3#4
2826 }%
2827 \def\tocleft@{\z@}\%
2828 \def\l@subsection{\%
2829 \l@sections\section\subsection}\% Implicit #3#4
2830 }%
2831 \def\l@subsubsection#1#2{\}%
2832 \def\l@paragraph#1#2{\}%
2833 \def\l@subparagraph#1#2{\}%
```

Activate the TOC processing.

```
2834 \let\toc@pre\toc@pre@auto
2835 \let\toc@post\toc@post@auto
2836 %</rmp>
```

Here ends the programmer's documentation.

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