The **elsarticle.cls** – Implimentation

Elsevier Ltd

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1 Implementation

```
1  ⟨∗class⟩
2  %%
3  %%
4  %%
5  \def\RCSfile{elsarticle}%
6  \def\RCSversion{3.4}%
7  \def\RCSdate{2024/04/04}%
8  \def\@shortjnl{\relax}
9  \def\@journal{Elsevier Ltd}
10 \def\@company{Elsevier Ltd}
11 \def\@issn{000-0000}
12 \def\@shortjid{elsarticle}
13 \NeedsTeXFormat{LaTeX2e}[1995/12/01]
14 \ProvidesClass{\@shortjid}[\RCSdate, \RCSversion: \@journal]
15 \def\ABD{\AtBeginDocument}
16 \newif\ifpreprint \preprintfalse
17 \newif\ifnonatbib \nonatbibfalse
18 \newif\iflongmktitle \longmktitlefalse
19 \newif\ifnopreprintline \nopreprintlinefalse
20 \newif\ifdoubleblind \doubleblindfalse
21
22 \newif\ifuseexplthreefunctions \useexplthreefunctionsfalse
23
24 \RequirePackage[T1]{fontenc}
25
26 \IfFileExists{expl3.sty}{%
27   \global\useexplthreefunctionstrue%
28   \RequirePackage{expl3}}{}
29 \ifuseexplthreefunctions\relax%
30  \IfFileExists{xparse.sty}{\RequirePackage{xparse}}{}
31  \IfFileExists{etoolbox.sty}{\RequirePackage{etoolbox}}{}
32 \fi
33
34 \def\@blstr{1}
35 \newdimen\@bls
36 \@bls=\baselineskip
37
38 \def\@finalWarning{%
39   **************************************************\MessageBreak
40   This document is typeset in the CRC style which\MessageBreak
```

```
41    is not suitable for submission.\MessageBreak
42    \MessageBreak
43    Please typeset again using 'preprint' option\MessageBreak
44    for creating PDF suitable for submission.\MessageBreak
45    ****************************************************\MessageBreak
46 }
47
48 \DeclareOption{preprint}{\global\preprinttrue
49    \gdef\@blstr{1}\xdef\jtype{0}%
50    \AtBeginDocument{\@twosidefalse\@mparswitchfalse}}
51 \DeclareOption{nopreprintline}{\global\nopreprintlinetrue}
52 \DeclareOption{final}{\gdef\@blstr{1}\global\preprintfalse}
53 \DeclareOption{review}{\global\preprinttrue\gdef\@blstr{1.5}}
54 \DeclareOption{authoryear}{\xdef\@biboptions{round,authoryear}}
55 \DeclareOption{number}{\xdef\@biboptions{numbers}}
56 \DeclareOption{numbers}{\xdef\@biboptions{numbers}}
57 \DeclareOption{nonatbib}{\global\nonatbibtrue}
58 \DeclareOption{longtitle}{\global\longmktitletrue}
59 \DeclareOption{5p}{\xdef\jtype{5}\global\preprintfalse
60    \ExecuteOptions{twocolumn}}
61    \def\jtype{0}
62 \DeclareOption{3p}{\xdef\jtype{3}\global\preprintfalse}
63 \DeclareOption{1p}{\xdef\jtype{1}\global\preprintfalse
64    \AtBeginDocument{\@twocolumnfalse}}
65 \DeclareOption{times}{\IfFileExists{txfonts.sty}%
66    {\AtEndOfClass{\RequirePackage{txfonts}%
67    \gdef\ttdefault{cmtt}%
68    \let\iint\relax
69    \let\iiint\relax
70    \let\iiiint\relax
71    \let\idotsint\relax
72    \let\openbox\relax}}{\AtEndOfClass{\RequirePackage{times}}}}
73
74 \DeclareOption{endfloat}{\IfFileExists{endfloat.sty}
75    {\AtEndOfClass{\RequirePackage[markers]{endfloat}}}{}}
76 \DeclareOption{endfloats}{\IfFileExists{endfloat.sty}
77    {\AtEndOfClass{\RequirePackage[markers]{endfloat}}}{}}
78 \DeclareOption{numafflabel}
79    {\AtBeginDocument{\def\theaffn{\arabic{affn}}}} %*%
80 \DeclareOption{lefttitle}
81    {\AtBeginDocument{\def\elsarticletitlealign{flushleft}}} %*%
82 \DeclareOption{centertitle}
83    {\AtBeginDocument{\def\elsarticletitlealign{center}}} %*%
84 \DeclareOption{reversenotenum}
85    {\AtBeginDocument{\def\theaffn{\arabic{affn}}
86     \def\thefnote{\alph{fnote}}}}
87 \DeclareOption{doubleblind}{\doubleblindtrue}
88
89 \ExecuteOptions{a4paper,10pt,oneside,onecolumn,number,preprint,centertitle}
90 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
91 \ProcessOptions
92 \LoadClass{article}
93 \RequirePackage{graphicx}
```

2 Preamble

```
94 \let\comma\@empty
95 \let\tnotesep\@empty
96 \let\@title\@empty
97
98 \def\useelstitle{}
99
100 \def\title#1{\g@addto@macro\@title{#1%
101         \global\let\tnoteref\@gobble}%
102         \g@addto@macro\useelstitle{#1}}
103
104 \def\elsLabel#1{\@bsphack\protected@write\@auxout{}%
105          {\string\Newlabel{#1}{\@currentlabel}}\@esphack}
106 \def\Newlabel#1#2{\expandafter\xdef\csname X@#1\endcsname{#2}}
107
108 \def\elsRef#1{\@ifundefined{X@#1}{0}{\csname X@#1\endcsname}}
109
110 \let\@tnotemark\@empty
111
112 \ifdoubleblind
113   \def\tnotemark[#1]{}
114 \else
115   \def\tnotemark[#1]{\@for\mytmark:=#1\do{%
116 %        \expandafter\ifcase\csname X@\mytmark\endcsname\or$^{\star}$\or
117         \expandafter\ifcase\elsRef{\mytmark}\or$^{\star}$\or
118       $^{,\star\star}$\fi
119     }%
120 }
121 \fi
122
123 \def\tnoteref#1{\tnotemark[{#1}]}
124 \let\@tnotes\@empty
125 \newcounter{tnote}
126 \def\tnotetext[#1]#2{\g@addto@macro\@tnotes{%
127   \stepcounter{tnote}\elsLabel{#1}%
128     \def\thefootnote{\ifcase\c@tnote\or$\star$\or$\star\star$\fi}%
129     \footnotetext{#2}}}
130
131 \let\@nonumnotes\@empty
132 \def\nonumnote#1{\g@addto@macro\@nonumnotes{%
133       \let\thefootnote\relax\footnotetext{#1}}}
134
135 \newcounter{fnote}
136 \def\thefnote{\arabic{fnote}}
137 \def\fnmark[#1]{\let\comma\@empty
138     \def\@fnmark{\@for\@@fnmark:=#1\do{%
139     \edef\fnotenum{\@ifundefined{X@\@@fnmark}{1}{\elsRef{\@@fnmark}}}%
140   \unskip\comma\fnotenum\let\comma,}}%
141 }
142
143 \def\fnref#1{\fnmark[#1]}
144
145 \let\@fnotes\@empty\let\@fnmark\@empty
```

```
146 \def\fntext[#1]#2{\g@addto@macro\@fnotes{%
147    \refstepcounter{fnote}\elsLabel{#1}%
148    \def\thefootnote{\thefnote}%
149    \global\setcounter{footnote}{\c@fnote}%
150    \footnotetext{#2}}}
151
152 \def\cormark[#1]{\edef\cnotenum{\elsRef{#1}}%
153    \unskip\textsuperscript{\sep\ifcase\cnotenum\or
154        $\ast$\or$\ast\ast$\fi\hspace{-1pt}}\let\sep=,}
155
156 \let\@cormark\@empty
157 \let\@cornotes\@empty
158 \newcounter{cnote}
159 \def\cortext[#1]#2{\g@addto@macro\@cornotes{%
160    \refstepcounter{cnote}\elsLabel{#1}%
161    \def\thefootnote{\ifcase\thecnote\or$\ast$\or
162    $\ast\ast$\fi}%
163    \footnotetext{#2}}}
164
165 \let\@corref\@empty
166 \def\corref#1{\edef\cnotenum{\elsRef{#1}}%
167    \edef\@corref{\ifcase\cnotenum\or
168        $\ast$\or$\ast\ast$\fi\hskip-1pt}}
169
170 \def\resetTitleCounters{\c@cnote=0
171    \c@fnote=0 \c@tnote=0 \c@footnote=0}
172
173 \let\eadsep\@empty
174 \def\@elseads{}
175 \let\@elsuads\@empty
176 \let\@cormark\@empty
177 \def\hashchar{\expandafter\@gobble\string\~}
178 \def\underscorechar{\expandafter\@gobble\string\_}
179 \def\lbracechar{\expandafter\@gobble\string\{}
180 \def\rbracechar{\expandafter\@gobble\string\}}
181
182 \gdef\ead{\@ifnextchar[{\@uad}{\@ead}}
183 \gdef\@ead#1{\bgroup
184    \def\_{\underscorechar}%
185    \def\{{\lbracechar}%
186    \def~{\hashchar}%
187    \def\}{\rbracechar}%
188    \edef\tmp{\the\@eadauthor}%
189    \immediate\write\@auxout{\string\emailauthor
190        {#1}{\expandafter\strip@prefix\meaning\tmp}}%
191    \egroup
192 }
193 \newcounter{ead}
194 \gdef\emailauthor#1#2{\stepcounter{ead}%
195    \g@addto@macro\@elseads{\raggedright%
196        \let\corref\@gobble\def\@@tmp{#1}%
197        \eadsep{\ttfamily\expandafter\strip@prefix\meaning\@@tmp}
198        (#2)\def\eadsep{\unskip,\space}}%
199 }
```

```latex
200 \gdef\@uad[#1]#2{\bgroup
201     \def~{\hashchar}%
202     \def\_{\underscorechar}%
203     \def~{\hashchar}%
204     \def\}{\rbracechar}%
205     \edef\tmp{\the\@eadauthor}
206     \immediate\write\@auxout{\string\urlauthor
207         {#2}{\expandafter\strip@prefix\meaning\tmp}}%
208     \egroup
209 }
210 \gdef\urlauthor#1#2{\g@addto@macro\@elsuads{\let\corref\@gobble%
211         \def\@@tmp{#1}\raggedright\eadsep
212         {\ttfamily\expandafter\strip@prefix\meaning\@@tmp}\space(#2)%
213         \def\eadsep{\unskip,\space}}%
214 }
215
216 \def\elsauthors{}
217 \def\useauthors{}
218 \def\elsprelimauthors{}
219
220 \def\pprinttitle{}
221 \let\authorsep\@empty
222 \let\prelimauthorsep\@empty
223 \let\sep\@empty
224 \newcounter{author}
225 \def\author{\@ifnextchar[{\@@author}{\@author}}
226
227 \newtoks\@eadauthor
228 \def\@@author[#1]#2{%
229     \g@addto@macro\elsprelimauthors{%
230         \prelimauthorsep#2%
231         \def\prelimauthorsep{\unskip,\space}}%
232     \g@addto@macro\elsauthors{%
233     \def\baselinestretch{1}%
234     \authorsep#2\unskip\textsuperscript{%#1
235         \@for\@@affmark:=#1\do{%
236         \edef\affnum{\@ifundefined{X@\@@affmark}{1}{\elsRef{\@@affmark}}}%
237         \unskip\sep\affnum\let\sep=,}%
238         \ifx\@fnmark\@empty\else\unskip\sep\@fnmark\let\sep=,\fi
239         \ifx\@corref\@empty\else\unskip\sep\@corref\let\sep=,\fi
240         }%
241     \def\authorsep{\unskip,\space}%
242     \global\let\sep\@empty\global\let\@corref\@empty
243     \global\let\@fnmark\@empty}%
244     \@eadauthor={#2}%
245     \g@addto@macro\useauthors{#2; }%
246 }
247
248 \def\@author#1{%
249     \g@addto@macro\elsprelimauthors{%
250         \prelimauthorsep#1%
251         \def\prelimauthorsep{\unskip,\space}}%
252     \g@addto@macro\elsauthors{\normalsize%
253     \def\baselinestretch{1}%
```

```latex
254     \upshape\authorsep#1\unskip\textsuperscript{%
255       \ifx\@fnmark\@empty\else\unskip\sep\@fnmark\let\sep=,\fi
256       \ifx\@corref\@empty\else\unskip\sep\@corref\let\sep=,\fi
257       }%
258     \def\authorsep{\unskip,\space}%
259     \global\let\@fnmark\@empty
260     \global\let\@corref\@empty    \global\let\sep\@empty}%
261     \@eadauthor={#1}%
262     \g@addto@macro\useauthors{#1; }%
263 }
264
265 \AtBeginDocument{%
266   \@ifpackageloaded{hyperref}{%
267     \expandafter\gdef\csname Hy@title\endcsname{\useelstitle}%
268     \expandafter\gdef\csname Hy@author\endcsname{\useauthors}%
269     }{}
270 }
271
272 \def\elsaddress{}
273 \def\addsep{\par\vskip6pt}
274
275 \def\@alph#1{%
276   \ifcase#1\or a\or b\or c\or d\or e\or f\or g\or h\or i\or j\or k\or
277   l\or m\or n\or o\or p\or q\or r\or s\or t\or u\or v\or w\or x\or
278   y\or z%
279   \or aa\or ab\or ac\or ad\or ae\or af\or ag\or ah\or ai\or aj\or
280   ak\or al\or am\or an\or ao\or ap\or aq\or ar\or as\or at\or au\or
281   av\or aw\or ax\or ay\or az%
282   \or ba\or bb\or bc\or bd\or be\or bf\or bg\or bh\or bi\or bj\or
283   bk\or bl\or bm\or bn\or bo\or bp\or bq\or br\or bs\or bt\or bu\or
284   bv\or bw\or bx\or by\or bz%
285   \or ca\or cb\or cc\or cd\or ce\or cf\or cg\or ch\or ci\or cj\or
286   ck\or cl\or cm\or cn\or co\or cp\or cq\or cr\or cs\or ct\or cu\or
287   cv\or cw\or cx\or cy\or cz%
288   \or da\or db\or dc\or dd\or de\or df\or dg\or dh\or di\or dj\or
289   dk\or dl\or dm\or dn\or do\or dp\or dq\or dr\or ds\or dt\or du\or
290   dv\or dw\or dx\or dy\or dz%
291   \or ea\or eb\or ec\or ed\or ee\or ef\or eg\or eh\or ei\or ej\or
292   ek\or el\or em\or en\or eo\or ep\or eq\or er\or es\or et\or eu\or
293   ev\or ew\or ex\or ey\or ez%
294   \or fa\or fb\or fc\or fd\or fe\or ff\or fg\or fh\or fi\or fj\or
295   fk\or fl\or fm\or fn\or fo\or fp\or fq\or fr\or fs\or ft\or fu\or
296   fv\or fw\or fx\or fy\or fz%
297   \or ga\or gb\or gc\or gd\or ge\or gf\or gg\or gh\or gi\or gj\or
298   gk\or gl\or gm\or gn\or go\or gp\or gq\or gr\or gs\or gt\or gu\or
299   gv\or gw\or gx\or gy\or gz%
300   \else\@ctrerr\fi}
301
302 \newcounter{affn}
303 \renewcommand\theaffn{\alph{affn}}
304
305 \ifuseexplthreefunctions\relax%
306   \ExplSyntaxOn
307   \def\ca_affitem_postskip{\mbox{~}\unskip\ignorespaces}
```

```
308   %%Author Address
309   \DeclareDocumentCommand \ca_organization { O{,} m }
310     {
311   %     #2 #1\mbox{~}\unskip\ignorespaces
312       \csgappto { ca_affiliation_values } { #2 #1\ca_affitem_postskip }
313     }
314   \DeclareDocumentCommand \ca_postal_code { O{,} m }
315     {
316   %     #2 #1\mbox{~}\unskip\ignorespaces
317       \csgappto { ca_affiliation_values } { #2 #1\ca_affitem_postskip }
318     }
319   \DeclareDocumentCommand \ca_aff_city { O{,}  m }
320     {
321   %     #2 #1\mbox{~}\unskip\ignorespaces
322       \csgappto { ca_affiliation_values } { #2 #1\ca_affitem_postskip }
323     }
324   \DeclareDocumentCommand \ca_address_line { O{,}m }
325     {
326   %     #2 #1\mbox{~}\unskip\ignorespaces
327       \csgappto { ca_affiliation_values } { #2 #1\ca_affitem_postskip }
328     }
329   \DeclareDocumentCommand \ca_state { O{,} m }
330     {
331   %     #2 #1\mbox{~}\unskip\ignorespaces
332       \csgappto { ca_affiliation_values } { #2 #1\ca_affitem_postskip }
333     }
334   \DeclareDocumentCommand \ca_country { O{ } m }
335     {
336   %     #2 #1
337       \csgappto { ca_affiliation_values } { #2 #1 }
338     }
339
340   \DeclareDocumentCommand \ca_stm_organization { O{,} m }
341     {
342       #2 #1\ca_affitem_postskip
343     }
344   \DeclareDocumentCommand \ca_stm_postal_code { O{,} m }
345     {
346       #2 #1\ca_affitem_postskip
347     }
348   \DeclareDocumentCommand \ca_stm_aff_city { O{,}  m }
349     {
350       #2 #1\ca_affitem_postskip
351     }
352   \DeclareDocumentCommand \ca_stm_aff_address_line { O{,}m }
353     {
354       #2 #1\ca_affitem_postskip
355     }
356   \DeclareDocumentCommand \ca_stm_state { O{,} m }
357     {
358       #2 #1\ca_affitem_postskip
359     }
360   \DeclareDocumentCommand \ca_stm_country { O{ } m }
361     {
```

```
362        #2 #1
363      }
364
365    \keys_define:nn { stm / affiliation }
366      {
367        op    .tl_set_x:N   = \l_organization_punc_tl,
368        oraganizationsep    .tl_set_x:N   = \l_organization_punc_tl,
369        oraganisationsep    .tl_set_x:N   = \l_organization_punc_tl,
370        ap    .tl_set_x:N   = \l_address_line_punc_tl,
371        addresslinesep   .tl_set_x:N   = \l_address_line_punc_tl,
372        cp    .tl_set_x:N   = \l_city_punc_tl,
373        citysep   .tl_set_x:N   = \l_city_punc_tl,
374        pp    .tl_set_x:N   = \l_postal_code_punc_tl,
375        postcodesep   .tl_set_x:N   = \l_postal_code_punc_tl,
376        sp    .tl_set_x:N   = \l_state_punc_tl,
377        statesep   .tl_set_x:N   = \l_state_punc_tl,
378        o     .code:n       = { \ca_organization[\l_organization_punc_tl]{#1} },
379        organization    .code:n        = { \ca_organization[\l_organization_punc_tl]{#1} },
380        organisation    .code:n        = { \ca_organization[\l_organization_punc_tl]{#1} },
381        a     .code:n       = { \ca_address_line[\l_address_line_punc_tl]{#1} },
382        addressline    .code:n       = { \ca_address_line[\l_address_line_punc_tl]{#1} },
383        c     .code:n       = { \ca_aff_city[\l_city_punc_tl]{#1} },
384        city .code:n       = { \ca_aff_city[\l_city_punc_tl]{#1} },
385        p     .code:n       = { \ca_postal_code[\l_postal_code_punc_tl]{#1} },
386        postcode    .code:n       = { \ca_postal_code[\l_postal_code_punc_tl]{#1} },
387        s     .code:n       = { \ca_state[\l_state_punc_tl]{#1} },
388        state    .code:n        = { \ca_state[\l_state_punc_tl]{#1} },
389        orp   .tl_set_x:N   = \l_organization_punc_tl,
390        adp   .tl_set_x:N   = \l_address_line_punc_tl,
391        cip   .tl_set_x:N   = \l_city_punc_tl,
392        pcp   .tl_set_x:N   = \l_postal_code_punc_tl,
393        stp   .tl_set_x:N   = \l_state_punc_tl,
394        cyp   .tl_set_x:N   = \l_country_punc_tl,
395        or    .code:n       = { \ca_organization[\l_organization_punc_tl]{#1} },
396        ad    .code:n       = { \ca_address_line[\l_address_line_punc_tl]{#1} },
397        ci    .code:n       = { \ca_aff_city[\l_city_punc_tl]{#1} },
398        pc    .code:n       = { \ca_postal_code[\l_postal_code_punc_tl]{#1} },
399        st    .code:n       = { \ca_state[\l_state_punc_tl]{#1} },
400        cy    .code:n       = { \ca_country[\l_country_punc_tl]{#1} },
401        country   .code:n = { \ca_country[\l_country_punc_tl]{#1} },
402        unknown   .code:n = {
403                            \ifstrempty { #1 } {
404                               \csxappto { ca_affiliation_values }
405                                   { {\l_keys_key_tl}~ }
406                            } {
407                               \csxappto { ca_affiliation_values }
408                                   { {#1}~ }
409                            }
410                         }
411      }
412
413    \cs_set:Npn \__reset_affiliation:
414    {
415      \tl_gset:Nn \l_organization_punc_tl { , }
```

```
416    \tl_gset:Nn \l_address_line_punc_tl { , }
417    \tl_gset:Nn \l_city_punc_tl { , }
418    \tl_gset:Nn \l_postal_code_punc_tl { , }
419    \tl_gset:Nn \l_state_punc_tl { , }
420    \tl_gset:Nn \l_country_punc_tl { }
421  }
422
423  \DeclareDocumentCommand\affiliation{ o m }{
424    \__reset_affiliation:
425    \csgdef { ca_affiliation_values } { }
426    \IfNoValueTF { #2 }
427      { }
428      {
429       \keys_set:nn { stm / affiliation } { #2 }
430      }
431    \IfNoValueTF { #1 }
432      {
433        \csgappto{elsauthors}{%
434          \par\vspace*{6pt}\noindent
435          \bgroup\def\baselinestretch{1}%
436           \footnotesize\itshape%
437           \unskip\ignorespaces}
438        \csxappto{elsauthors}{\csuse { ca_affiliation_values }}
439        \csgappto{elsauthors}{\par\vspace*{6pt}
440          \noindent\unskip\ignorespaces
441          \gdef\authorsep{}
442        \egroup}
443      }
444      {
445        \csgappto{elsaddress}{
446        \def\baselinestretch{1}%
447        \refstepcounter{affn}
448        \xdef\@currentlabel{\theaffn}
449        \IfNoValueTF { #1 }
450          { }
451          { \elsLabel{#1} }
452        \textsuperscript{\theaffn}}
453        \csxappto{elsaddress}{
454          \csuse { ca_affiliation_values }
455          \par
456        }
457      }
458  }
459  \ExplSyntaxOff
460  \else%
461  \def\caaffitempostskip{\space}
462
463  \DeclareRobustCommand\caorganization[2][,]{%
464     \g@addto@macro\caaffiliationvalues{#2#1\caaffitempostskip}%
465  }
466  \DeclareRobustCommand\capostalcode[2][,]{%
467     \g@addto@macro\caaffiliationvalues{#2#1\caaffitempostskip}%
468  }
469  \DeclareRobustCommand\caaffcity[2][,]{%
```

```
470      \g@addto@macro\caaffiliationvalues{#2#1\caaffitempostskip}%
471    }
472    \DeclareRobustCommand\caaddressline[2][,]{%
473      \g@addto@macro\caaffiliationvalues{#2#1\caaffitempostskip}%
474    }
475    \DeclareRobustCommand\castate[2][,]{%
476      \g@addto@macro\caaffiliationvalues{#2#1\caaffitempostskip}%
477    }
478    \DeclareRobustCommand\cacountry[2][,]{%
479      \g@addto@macro\caaffiliationvalues{#2#1\caaffitempostskip}%
480    }
481    \DeclareRobustCommand\castmorganization[2][,]{%
482      #2#1\caaffitempostskip%
483    }
484    \DeclareRobustCommand\castmpostalcode[2][,]{%
485      #2#1\caaffitempostskip%
486    }
487    \DeclareRobustCommand\castmaffcity[2][,]{%
488      #2#1\caaffitempostskip%
489    }
490    \DeclareRobustCommand\castmaddressline[2][,]{%
491      #2#1\caaffitempostskip%
492    }
493    \DeclareRobustCommand\castmstate[2][,]{%
494      #2#1\caaffitempostskip%
495    }
496    \DeclareRobustCommand\castmcountry[2][,]{%
497      #2#1\caaffitempostskip%
498    }
499
500    \define@key{affiliation}{op}{\xdef\@organizationpunc{#1}}
501    \define@key{affiliation}{orp}{\xdef\@organizationpunc{#1}}
502    \define@key{affiliation}{organizationsep}{\xdef\@organizationpunc{#1}}
503    \define@key{affiliation}{ap}{\xdef\@addresslinepunc{#1}}
504    \define@key{affiliation}{adp}{\xdef\@addresslinepunc{#1}}
505    \define@key{affiliation}{addresslinesep}{\xdef\@addresslinepunc{#1}}
506    \define@key{affiliation}{cp}{\xdef\@citypunc{#1}}
507    \define@key{affiliation}{cip}{\xdef\@citypunc{#1}}
508    \define@key{affiliation}{cyp}{\xdef\@countrypunc{#1}}
509    \define@key{affiliation}{citysep}{\xdef\@citypunc{#1}}
510    \define@key{affiliation}{pp}{\xdef\@postcodepunc{#1}}
511    \define@key{affiliation}{pop}{\xdef\@postcodepunc{#1}}
512    \define@key{affiliation}{postcodesep}{\xdef\@postcodepunc{#1}}
513    \define@key{affiliation}{sp}{\xdef\@statepunc{#1}}
514    \define@key{affiliation}{stp}{\xdef\@statepunc{#1}}
515    \define@key{affiliation}{statesep}{\xdef\@statepunc{#1}}
516    \define@key{affiliation}{countrysep}{\xdef\@countrypunc{#1}}
517
518    \define@key{affiliation}{organization}{%
519     \caorganization[\@organizationpunc]{#1}}
520    \define@key{affiliation}{addressline}{%
521     \caaddressline[\@addresslinepunc]{#1}}
522    \define@key{affiliation}{city}{%
523     \caaffcity[\@citypunc]{#1}}
```

```
524  \define@key{affiliation}{postcode}{%
525   \capostalcode[\@postcodepunc]{#1}}
526  \define@key{affiliation}{state}{%
527   \castate[\@statepunc]{#1}}
528  \define@key{affiliation}{or}{%
529   \caorganization[\@organizationpunc]{#1}}
530  \define@key{affiliation}{ad}{%
531   \caaddressline[\@addresslinepunc]{#1}}
532  \define@key{affiliation}{ci}{%
533   \caaffcity[\@citypunc]{#1}}
534  \define@key{affiliation}{po}{%
535   \capostalcode[\@postcodepunc]{#1}}
536  \define@key{affiliation}{st}{%
537   \castate[\@statepunc]{#1}}
538  \define@key{affiliation}{o}{%
539   \caorganization[\@organizationpunc]{#1}}
540  \define@key{affiliation}{a}{%
541   \caaddressline[\@addresslinepunc]{#1}}
542  \define@key{affiliation}{c}{%
543   \cacity[\@citypunc]{#1}}
544  \define@key{affiliation}{p}{%
545   \capostcode[\@postcodepunc]{#1}}
546  \define@key{affiliation}{s}{%
547   \castate[\@statepunc]{#1}}
548  \define@key{affiliation}{cy}{%
549   \cacountry[\@countrypunc]{#1}}
550  \define@key{affiliation}{country}{%
551   \cacountry[\@countrypunc]{#1}}
552
553
554  \gdef\@resetaffiliation{%
555    \gdef\@organizationpunc{,}%
556    \gdef\@addresslinepunc{,}%
557    \gdef\@citypunc{,}%
558    \gdef\@statepunc{,}%
559    \gdef\@postcodepunc{,}%
560    \gdef\@countrypunc{}%
561  }
562
563  \def\affiliation{\@ifnextchar[{\@@affiliation}{\@affiliation}}
564
565  \newcommand*{\newstmrobustcmd}{}
566  \protected\def\newstmrobustcmd{\@star@or@long\stmetb@new@command}
567
568  \def\stmetb@new@command#1{\@testopt{\stmetb@newcommand#1}0}
569
570  \def\stmetb@newcommand#1[#2]{%
571    \@ifnextchar[%
572      {\stmetb@xargdef#1[#2]}
573      {\ifx\l@ngrel@x\relax
574         \let\l@ngrel@x\protected
575       \else
576         \protected\def\l@ngrel@x{\protected\long}%
577       \fi
```

```
578        \@argdef#1[#2]}}

580    \long\def\stmetb@xargdef#1[#2][#3]#4{%
581       \@ifdefinable#1{%
582         \expandafter\protected
583         \expandafter\def
584         \expandafter#1%
585         \expandafter{%
586           \expandafter\@testopt
587           \csname\string#1\endcsname{#3}}%
588         \expandafter\@yargdef\csname\string#1\endcsname\tw@{#2}{#4}}}
589    %
590    \newcommand{\ifstmundef}[1]{%
591       \ifdefined#1%
592         \ifx#1\relax
593           \expandafter\expandafter
594           \expandafter\@firstoftwo
595         \else
596           \expandafter\expandafter
597           \expandafter\@secondoftwo
598         \fi
599       \else
600         \expandafter\@firstoftwo
601       \fi}
602    \newcommand{\stmexpandonce}[1]{%
603       \unexpanded\expandafter{#1}}
604    \newstmrobustcmd{\gstmappto}[2]{%
605       \ifundef{#1}
606         {\xdef#1{\unexpanded{#2}}}
607         {\xdef#1{\stmexpandonce#1\unexpanded{#2}}}}
608    \newstmrobustcmd{\xstmappto}[2]{%
609       \ifstmundef{#1}
610         {\xdef#1{#2}}
611         {\xdef#1{\stmexpandonce#1#2}}}


614    \long\def\@@affiliation[#1]#2{%
615         \@resetaffiliation%
616         \gdef\caaffiliationvalues{}%
617         \elsLabel{#1}%
618         \setkeys{affiliation}{#2}%
619         \g@addto@macro\elsaddress{%
620         \def\baselinestretch{1}%
621         \refstepcounter{affn}%
622         \xdef\@currentlabel{\theaffn}%
623         \elsLabel{#1}%
624         \textsuperscript{\theaffn}}
625         \xstmappto\elsaddress{\caaffiliationvalues\par}}

627    \long\def\@affiliation#1{%
628         \@resetaffiliation%
629         \gdef\caaffiliationvalues{}%
630         \setkeys{affiliation}{#1}%
631         \g@addto@macro\elsauthors{%
```

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```
632        \def\baselinestretch{1}}%
633        \xstmappto\elsaddress{\caaffiliationvalues\par}}
634 \fi
635
636 \def\address{\@ifnextchar[{\@@address}{\@address}}
637
638 \long\def\@@address[#1]#2{\g@addto@macro\elsaddress{%
639     \def\baselinestretch{1}%
640     \refstepcounter{affn}
641     \xdef\@currentlabel{\theaffn}
642     \elsLabel{#1}%
643     \textsuperscript{\theaffn}#2\par}}
644
645 \long\def\@address#1{\g@addto@macro\elsauthors{%
646     \def\baselinestretch{1}%
647     \addsep\footnotesize\itshape#1\def\addsep{\par\vskip6pt}%
648     \def\authorsep{\par\vskip8pt}}}
649
650 \newbox\absbox
651 \let\@elsarticleabstitle\@empty %*%
652 \def\abstracttitle#1{\gdef\@elsarticleabstitle{#1}} %*%
653 \abstracttitle{Abstract} %*%
654 \renewenvironment{abstract}{\global\setbox\absbox=\vbox\bgroup
655   \hsize=\textwidth\def\baselinestretch{1}%
656   \noindent\unskip\textbf{\@elsarticleabstitle} %*%
657 \par\medskip\noindent\unskip\ignorespaces}
658 {\egroup}
659
660 \newbox\elsarticlehighlightsbox
661 \newbox\elsarticlegrabsbox
662 \def\@elsarticlehighlightstitle{Highlights}
663 \def\@elsarticlegrabstitle{Graphical Abstract}
664 \newif\ifelsprelimpagegrabs\global\elsprelimpagegrabsfalse
665 \newif\ifelsprelimpagehl\global\elsprelimpagehlfalse
666 \def\elsarticleprelims{%
667 \ifelsprelimpagegrabs\relax%
668    \thispagestyle{empty}%
669    \unvbox\elsarticlegrabsbox%
670    \pagebreak\clearpage%
671 \fi%
672 \ifelsprelimpagehl\relax%
673    \thispagestyle{empty}
674    \unvbox\elsarticlehighlightsbox%
675    \pagebreak\clearpage%
676    \setcounter{page}{1}%
677 \fi%
678 }
679 \newenvironment{highlights}{%
680   \global\elsprelimpagehltrue%
681   \global\setbox\elsarticlehighlightsbox=\vbox\bgroup
682   \hsize=\textwidth\def\baselinestretch{1}%
683   \noindent\unskip{\Large\@elsarticlehighlightstitle}%*%
684   \par\vskip12pt\noindent\unskip\ignorespaces\textbf{\@title}%
685   \ifx\elsprelimauthors\@empty\relax\else%
```

```
686     \par\vskip6pt\noindent\unskip\ignorespaces%
687     \ifdoubleblind%
688       \vspace*{2pc}
689     \else%
690       \elsprelimauthors%
691     \fi%
692   \fi%
693   \par\medskip\noindent\unskip\ignorespaces
694   \begin{itemize}
695   }
696   {\end{itemize}
697     \egroup}
698 \newenvironment{graphicalabstract}{%
699   \global\elsprelimpagegrabstrue%
700   \global\setbox\elsarticlegrabsbox=\vbox\bgroup
701   \hsize=\textwidth\def\baselinestretch{1}%
702   \noindent\unskip{\Large\@elsarticlegrabtitle}%*%
703   \par\vskip12pt\noindent\unskip\ignorespaces\textbf{\@title}%
704   \ifx\elsprelimauthors\@empty\relax\else%
705     \par\vskip6pt\noindent\unskip\ignorespaces%
706     \ifdoubleblind%
707       \vspace*{2pc}
708     \else%
709       \elsprelimauthors%
710     \fi%
711   \fi%
712   \par\medskip\noindent\unskip\ignorespaces}
713   {\egroup}
714
715 \newbox\keybox
716 \let\@elsarticlekwdtitle\@empty %*%
717 \def\keywordtitle#1{\gdef\@elsarticlekwdtitle{#1}} %*%
718 \def\keywordtitlesep#1{\gdef\@elsarticlekeywordtitlesep{#1}} %*%
719 \keywordtitle{Keywords} %*%
720 \keywordtitlesep{:\ }
721 \def\keyword{%
722   \def\sep{\unskip, }%
723 \def\MSC{\@ifnextchar[{\@MSC}{\@MSC[2000]}}
724   \def\@MSC[##1]{\par\leavevmode\hbox {\it ##1~MSC:\space}}%
725   \def\PACS{\par\leavevmode\hbox {\it PACS:\space}}%
726   \def\JEL{\par\leavevmode\hbox {\it JEL:\space}}%
727   \global\setbox\keybox=\vbox\bgroup\hsize=\textwidth
728   \normalsize\normalfont\def\baselinestretch{1}
729   \parskip\z@
730   \noindent\textit{\@elsarticlekwdtitle\@elsarticlekeywordtitlesep}
731   \raggedright                          % Keywords are not justified.
732   \ignorespaces}
733 \def\endkeyword{\par \egroup}
734
735 \newdimen\Columnwidth
736 \Columnwidth=\columnwidth
737
738 \def\printFirstPageNotes{%
739   \iflongmktitle
```

```
740      \let\columnwidth=\textwidth
741    \fi
742 \ifdoubleblind
743 \else
744    \ifx\@tnotes\@empty\else\@tnotes\fi
745    \ifx\@nonumnotes\@empty\else\@nonumnotes\fi
746    \ifx\@cornotes\@empty\else\@cornotes\fi
747    \ifx\@elseads\@empty\relax\else
748     \let\thefootnote\relax
749     \footnotetext{\ifnum\theead=1\relax
750        \textit{Email address:\space}\else
751        \textit{Email addresses:\space}\fi
752       \@elseads}\fi
753    \ifx\@elsuads\@empty\relax\else
754     \let\thefootnote\relax
755     \footnotetext{\textit{URL:\space}%
756       \@elsuads}\fi
757 \fi
758    \ifx\@fnotes\@empty\else\@fnotes\fi
759    \iflongmktitle\if@twocolumn
760    \let\columnwidth=\Columnwidth\fi\fi
761 }
762
763 %% Pushing text to begin on newpage %*%
764 \def\newpage@after@title{title}
765 \def\newpage@after@author{author}
766 \def\newpage@after@abstract{abstract}
767 \def\newpageafter#1%
768     {\gdef\@elsarticlenewpageafter{#1}}
769
770 \long\def\pprintMaketitle{\clearpage
771    \iflongmktitle\if@twocolumn\let\columnwidth=\textwidth\fi\fi
772    \resetTitleCounters
773    \def\baselinestretch{1}%
774    \printFirstPageNotes
775    \begin{\elsarticletitlealign}%
776 \thispagestyle{pprintTitle}%
777    \def\baselinestretch{1}%
778    \Large\@title\par\vskip18pt%
779    \ifx\@elsarticlenewpageafter\newpage@after@title% %*%
780      \newpage
781    \fi%
782    \ifdoubleblind
783      \vspace*{2pc}
784    \else
785      \normalsize\elsauthors\par\vskip10pt
786      \footnotesize\itshape\elsaddress\par\vskip36pt
787    \fi
788    \ifx\@elsarticlenewpageafter\newpage@after@author% %*%
789      \newpage
790    \fi%
791    \hrule\vskip12pt
792    \ifvoid\absbox\else\unvbox\absbox\par\vskip10pt\fi
793    \ifvoid\keybox\else\unvbox\keybox\par\vskip10pt\fi
```

```latex
794      \hrule\vskip12pt
795      \ifx\@elsarticlenewpageafter\newpage@after@abstract% %*%
796        \newpage
797      \fi%
798      \end{\elsarticletitlealign}%
799      \gdef\thefootnote{\arabic{footnote}}%
800    }
801
802 \def\printWarning{%
803      \mbox{}\par\vfill\par\bgroup
804      \fboxsep12pt\fboxrule1pt
805      \hspace*{.18\textwidth}
806      \fcolorbox{gray50}{gray10}{\box\warnbox}
807      \egroup\par\vfill\thispagestyle{empty}
808      \setcounter{page}{0}
809      \clearpage}
810
811 \long\def\finalMaketitle{%
812    \resetTitleCounters
813    \def\baselinestretch{1}%
814    \MaketitleBox
815    \thispagestyle{pprintTitle}%
816    \gdef\thefootnote{\arabic{footnote}}%
817    }
818
819 \long\def\MaketitleBox{%
820    \resetTitleCounters
821    \def\baselinestretch{1}%
822    \begin{\elsarticletitlealign}%
823     \def\baselinestretch{1}%
824      \Large\@title\par\vskip18pt
825    \ifdoubleblind
826      \vspace*{2pc}
827    \else
828      \normalsize\elsauthors\par\vskip10pt
829      \footnotesize\itshape\elsaddress\par\vskip36pt
830    \fi
831      \hrule\vskip12pt
832      \ifvoid\absbox\else\unvbox\absbox\par\vskip10pt\fi
833      \ifvoid\keybox\else\unvbox\keybox\par\vskip10pt\fi
834      \hrule\vskip12pt
835      \end{\elsarticletitlealign}%
836 }
837
838 \def\FNtext#1{\par\bgroup\footnotesize#1\egroup}
839 \newdimen\space@left
840 \def\alarm#1{\typeout{****************************}%
841              \typeout{#1}%
842              \typeout{****************************}%
843 }
844
845 \def\titlespancalculator#1#2#3#4{%
846   % break count
847   \@tempcnta=#4\relax%
```

```latex
848  % pagebreakcount increment
849  \advance\@tempcnta by 1\relax%
850  % title page height
851  \@tempdima=#1\relax%
852  % Page height - title page notes height (only for first break)
853  % Page height - textheight (for remaining breaks)
854  % Page height - title page notes height
855  \@tempdimb=#2\relax%
856  % Remaining title page height
857  \advance\@tempdima -\the\@tempdimb%
858  % Checks if remaining title page
859  % height less than textheight
860  \ifdim\the\@tempdima>#3\relax%
861    \titlespancalculator%
862     {\the\@tempdima}{#3}{#3}{\the\@tempcnta}%Break again
863  \else%
864  % Save break count and exit.
865    \xdef\savetitlepagespan{\the\@tempcnta}%
866  \fi%
867 }%
868
869 \long\def\myfor#1#2#3{%
870  \@tempcnta=#1\relax%
871  \ifnum#1<#2\relax%
872    \advance\@tempcnta by 1\relax%
873    #3%
874    \myfor{\the\@tempcnta}{#2}{#3}%
875  \fi}
876
877 \long\def\getSpaceLeft{%\global\@twocolumnfalse%
878   \global\setbox0=\vbox{\hsize=\textwidth\MaketitleBox}%
879   \global\setbox1=\vbox{\hsize=\textwidth
880   \let\footnotetext\FNtext
881   \printFirstPageNotes}%
882   \xdef\noteheight{\the\ht1}%
883   \xdef\titleheight{\the\ht0}%
884   \@tempdima=\vsize
885   \advance\@tempdima-\noteheight
886   \advance\@tempdima-1\baselineskip
887   \xdef\savefpageheight{\the\@tempdima}%
888   \setbox2=\vbox{\titlespancalculator{\titleheight}%
889      {\savefpageheight}{\textheight}{0}}%
890 }
891
892   \skip\footins=24pt
893
894 \newbox\els@boxa
895 \newbox\els@boxb
896
897 \ifpreprint
898   \def\maketitle{\elsarticleprelims\pprintMaketitle}
899   \else
900    \ifnum\jtype=1
901     \def\maketitle{%
```

```
902      \elsarticleprelims%
903      \iflongmktitle\getSpaceLeft
904        \ifdim\noteheight>0pt%
905    \advance\@tempdima-1.35\baselineskip
906        \fi%
907      \global\setbox\els@boxa=\vsplit0 to \@tempdima
908      \box\els@boxa\par\resetTitleCounters
909      \thispagestyle{pprintTitle}%
910      \printFirstPageNotes
911      \ifnum\savetitlepagespan>1\relax%
912      \myfor{2}{\savetitlepagespan}{%
913      \global\setbox\els@boxb=\vsplit0 to \textheight%\@tempdima
914      \box\els@boxb}
915      \else%
916      \fi%
917      \box0%
918      \else
919      \finalMaketitle\printFirstPageNotes
920      \fi
921    \gdef\thefootnote{\arabic{footnote}}}%
922  \else
923  \ifnum\jtype=5
924     \def\maketitle{%
925      \elsarticleprelims%
926      \iflongmktitle\getSpaceLeft
927        \ifdim\noteheight>0pt%
928    \advance\@tempdima-1.35\baselineskip
929        \fi%
930      \global\setbox\els@boxa=\vsplit0 to \@tempdima
931      \box\els@boxa\par\resetTitleCounters
932      \thispagestyle{pprintTitle}%
933      \printFirstPageNotes
934      \ifnum\savetitlepagespan>1\relax%
935      \myfor{2}{\savetitlepagespan}{%
936      \global\setbox\els@boxb=\vsplit0 to \textheight%\@tempdima
937      \twocolumn[\box\els@boxb]}
938      \else%
939      \fi%
940      \twocolumn[\box0]%\printFirstPageNotes
941      \else
942      \twocolumn[\finalMaketitle]\printFirstPageNotes
943      \fi
944      \gdef\thefootnote{\arabic{footnote}}}
945   \else
946   \if@twocolumn
947     \def\maketitle{%
948        \elsarticleprelims%
949        \iflongmktitle\getSpaceLeft
950          \ifdim\noteheight>0pt%
951    \advance\@tempdima-1.35\baselineskip
952        \fi%
953      \global\setbox\els@boxa=\vsplit0 to \@tempdima
954      \box\els@boxa\par\resetTitleCounters
955      \thispagestyle{pprintTitle}%
```

19

```
956        \printFirstPageNotes
957        \ifnum\savetitlepagespan>1\relax%
958        \myfor{2}{\savetitlepagespan}{%
959        \global\setbox\els@boxb=\vsplit0 to \textheight%\@tempdima
960        \twocolumn[\box\els@boxb]}
961        \else%
962        \fi%
963        \twocolumn[\box0]%
964       \else
965       \twocolumn[\finalMaketitle]\printFirstPageNotes
966       \fi
967     \gdef\thefootnote{\arabic{footnote}}}%
968    \else
969     \def\maketitle{%
970       \elsarticleprelims%
971       \iflongmktitle\getSpaceLeft
972         \ifdim\noteheight>0pt%
973      \advance\@tempdima-1.35\baselineskip
974         \fi%
975       \global\setbox\els@boxa=\vsplit0 to \@tempdima
976       \box\els@boxa\par\resetTitleCounters
977       \thispagestyle{pprintTitle}%
978       \printFirstPageNotes
979       \ifnum\savetitlepagespan>1\relax%
980       \myfor{2}{\savetitlepagespan}{%
981       \global\setbox\els@boxb=\vsplit0 to \textheight%\@tempdima
982       \box\els@boxb}
983       \else%
984       \fi%
985       \box0%
986      \else
987       \elsarticleprelims%
988       \finalMaketitle\printFirstPageNotes
989      \fi
990     \gdef\thefootnote{\arabic{footnote}}}%
991    \fi
992   \fi
993  \fi
994 \fi
995
996 \let\@elsarticlemyfooter\@empty
997 \let\@elsarticlemyfooteralign\@empty
998 \def\@elsarticlemyfooteralignleft{L}
999 \def\@elsarticlemyfooteralignright{R}
1000 \def\@elsarticlemyfooteraligncenter{C}
1001
1002 \def\myfooter[#1]#2 %*%
1003       {\gdef\@elsarticlemyfooteralign{#1}
1004       \gdef\@elsarticlemyfooter{#2}}
1005
1006
1007 \def\myfooterfont#1{\gdef\@myfooterfont{#1}}
1008 \myfooterfont{\footnotesize\itshape}
```

3 Headers/footers

```
1009 \def\ps@pprintTitle{%
1010      \let\@oddhead\@empty
1011      \let\@evenhead\@empty
1012      \def\@oddfoot
1013        {\hbox to \textwidth%
1014         {\ifnopreprintline\relax\else
1015         \@myfooterfont%
1016         \ifx\@elsarticlemyfooteralign\@elsarticlemyfooteraligncenter%
1017           \hfil\@elsarticlemyfooter\hfil%
1018         \else%
1019         \ifx\@elsarticlemyfooteralign\@elsarticlemyfooteralignleft%
1020           \@elsarticlemyfooter\hfill{}%
1021         \else%
1022         \ifx\@elsarticlemyfooteralign\@elsarticlemyfooteralignright%
1023           {}\hfill\@elsarticlemyfooter%
1024         \else%
1025               Preprint submitted to \ifx\@journal\@empty%
1026                 Elsevier%
1027             \else\@journal\fi\hfill\@date\fi%
1028         \fi%
1029         \fi%
1030         \fi%
1031        }%
1032       }%
1033      \let\@evenfoot\@oddfoot}
```

4 Section headings

```
1034 \def\@seccntDot{.}
1035 \def\@seccntformat#1{\csname the#1\endcsname\@seccntDot\hskip 0.5em}
1036
1037 \renewcommand\section{\@startsection {section}{1}{\z@}%
1038          {18\p@ \@plus 6\p@ \@minus 3\p@}%
1039          {9\p@ \@plus 6\p@ \@minus 3\p@}%
1040          {\normalsize\bfseries\boldmath}}
1041 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
1042          {12\p@ \@plus 6\p@ \@minus 3\p@}%
1043          {3\p@ \@plus 6\p@ \@minus 3\p@}%
1044          {\normalfont\normalsize\itshape}}
1045 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
1046          {12\p@ \@plus 6\p@ \@minus 3\p@}%
1047          {\p@}%
1048          {\normalfont\normalsize\itshape}}
1049
1050 \def\paragraph{\secdef{\els@aparagraph}{\els@bparagraph}}
1051 \def\els@aparagraph[#1]#2{\elsparagraph[#1]{#2.}}
1052 \def\els@bparagraph#1{\elsparagraph*{#1.}}
1053
1054 \newcommand\elsparagraph{\@startsection{paragraph}{4}{0\z@}%
1055          {10\p@ \@plus 6\p@ \@minus 3\p@}%
1056          {-6\p@}%
1057          {\normalfont\itshape}}
```

5   List environment

```
1058 \newdimen\leftMargin
1059 \leftMargin=2em
1060 \newtoks\@enLab  %\newtoks\@enfont
1061 \def\@enQmark{?}
1062 \def\@enLabel#1#2{%
1063   \edef\@enThe{\noexpand#1{\@enumctr}}%
1064   \@enLab\expandafter{\the\@enLab\csname the\@enumctr\endcsname}%
1065   \@enloop}
1066 \def\@enSpace{\afterassignment\@enSp@ce\let\@tempa= }
1067 \def\@enSp@ce{\@enLab\expandafter{\the\@enLab\space}\@enloop}
1068 \def\@enGroup#1{\@enLab\expandafter{\the\@enLab{#1}}\@enloop}
1069 \def\@enOther#1{\@enLab\expandafter{\the\@enLab#1}\@enloop}
1070 \def\@enloop{\futurelet\@entemp\@enloop@}
1071 \def\@enloop@{%
1072   \ifx A\@entemp        \def\@tempa{\@enLabel\Alph  }\else
1073   \ifx a\@entemp        \def\@tempa{\@enLabel\alph  }\else
1074   \ifx i\@entemp        \def\@tempa{\@enLabel\roman }\else
1075   \ifx I\@entemp        \def\@tempa{\@enLabel\Roman }\else
1076   \ifx 1\@entemp        \def\@tempa{\@enLabel\arabic}\else
1077   \ifx \@sptoken\@entemp \let\@tempa\@enSpace        \else
1078   \ifx \bgroup\@entemp   \let\@tempa\@enGroup        \else
1079   \ifx \@enum@\@entemp   \let\@tempa\@gobble         \else
1080                         \let\@tempa\@enOther
1081          \fi\fi\fi\fi\fi\fi\fi\fi
1082   \@tempa}
1083 \newlength{\@sep} \newlength{\@@sep}
1084 \setlength{\@sep}{.5\baselineskip plus.2\baselineskip
1085            minus.2\baselineskip}
1086 \setlength{\@@sep}{.1\baselineskip plus.01\baselineskip
1087            minus.05\baselineskip}
1088 \providecommand{\sfbc}{\rmfamily\upshape}
1089 \providecommand{\sfn}{\rmfamily\upshape}
1090 \def\@enfont{\ifnum \@enumdepth >1\let\@nxt\sfn \else\let\@nxt\sfbc \fi\@nxt}
1091 \def\enumerate{%
1092   \ifnum \@enumdepth >3 \@toodeep\else
1093     \advance\@enumdepth \@ne
1094     \edef\@enumctr{enum\romannumeral\the\@enumdepth}\fi
1095   \@ifnextchar[{\@@enum@}{\@enum@}}
1096 \def\@@enum@[#1]{%
1097   \@enLab{}\let\@enThe\@enQmark
1098   \@enloop#1\@enum@
1099   \ifx\@enThe\@enQmark\@warning{The counter will not be printed.%
1100    ^^J\space\@spaces\@spaces\@spaces The label is: \the\@enLab}\fi
1101   \expandafter\edef\csname label\@enumctr\endcsname{\the\@enLab}%
1102   \expandafter\let\csname the\@enumctr\endcsname\@enThe
1103   \csname c@\@enumctr\endcsname7
1104   \expandafter\settowidth
1105          \csname leftmargin\romannumeral\@enumdepth\endcsname
1106          {\the\@enLab\hskip\labelsep}%
1107   \@enum@}
1108 \def\@enum@{\list{{\@enfont\csname label\@enumctr\endcsname}}%
1109          {\usecounter{\@enumctr}\def\makelabel##1{\hss\llap{##1}}%
```

```
1110     \ifnum \@enumdepth>1\setlength{\topsep}{\@@sep}\else
1111           \setlength{\topsep}{\@sep}\fi
1112     \ifnum \@enumdepth>1\setlength{\itemsep}{0pt plus1pt minus1pt}%
1113      \else \setlength{\itemsep}{\@@sep}\fi
1114     %\setlength\leftmargin{\leftMargin}%%%{1.8em}
1115     \setlength{\parsep}{0pt plus1pt minus1pt}%
1116     \setlength{\parskip}{0pt plus1pt minus1pt}
1117               }}
1118
1119 \def\endenumerate{\par\ifnum \@enumdepth >1\addvspace{\@@sep}\else
1120           \addvspace{\@sep}\fi \endlist}
1121
1122 \def\sitem{\@noitemargtrue\@item[\@itemlabel *]}
1123
1124 \def\itemize{\@ifnextchar[{\@Itemize}{\@Itemize[]}}
1125
1126 \def\@Itemize[#1]{\def\next{#1}%
1127   \ifnum \@itemdepth >\thr@@\@toodeep\else
1128   \advance\@itemdepth\@ne
1129   \ifx\next\@empty\else\expandafter\def\csname
1130   labelitem\romannumeral\the\@itemdepth\endcsname{#1}\fi%
1131   \edef\@itemitem{labelitem\romannumeral\the\@itemdepth}%
1132   \expandafter\list\csname\@itemitem\endcsname
1133   {\def\makelabel##1{\hss\llap{##1}}}%
1134 \fi}
```

6   Theorem environment

```
1135 \def\newdefinition#1{%
1136   \@ifnextchar[{\@odfn{#1}}{\@ndfn{#1}}}%]
1137 \def\@ndfn#1#2{%
1138   \@ifnextchar[{\@xndfn{#1}{#2}}{\@yndfn{#1}{#2}}}
1139 \def\@xndfn#1#2[#3]{%
1140   \expandafter\@ifdefinable\csname #1\endcsname
1141     {\@definecounter{#1}\@newctr{#1}[#3]%
1142     \expandafter\xdef\csname the#1\endcsname{%
1143       \expandafter\noexpand\csname the#3\endcsname \@dfncountersep
1144         \@dfncounter{#1}}%
1145     \global\@namedef{#1}{\@dfn{#1}{#2}}%
1146     \global\@namedef{end#1}{\@enddefinition}}}
1147 \def\@yndfn#1#2{%
1148   \expandafter\@ifdefinable\csname #1\endcsname
1149     {\@definecounter{#1}%
1150     \expandafter\xdef\csname the#1\endcsname{\@dfncounter{#1}}%
1151     \global\@namedef{#1}{\@dfn{#1}{#2}}%
1152     \global\@namedef{end#1}{\@enddefinition}}}
1153 \def\@odfn#1[#2]#3{%
1154   \@ifundefined{c@#2}{\@nocounterr{#2}}%
1155     {\expandafter\@ifdefinable\csname #1\endcsname
1156     {\global\@namedef{the#1}{\@nameuse{the#2}}
1157   \global\@namedef{#1}{\@dfn{#2}{#3}}%
1158   \global\@namedef{end#1}{\@enddefinition}}}}
1159 \def\@dfn#1#2{%
1160   \refstepcounter{#1}%
```

```
1161     \@ifnextchar[{\@ydfn{#1}{#2}}{\@xdfn{#1}{#2}}}
1162 \def\@xdfn#1#2{%
1163     \@begindefinition{#2}{\csname the#1\endcsname}\ignorespaces}
1164 \def\@ydfn#1#2[#3]{%
1165     \@opargbegindefinition{#2}{\csname the#1\endcsname}{#3}\ignorespaces}
1166 \def\dfncounter#1{\noexpand\arabic{#1}}
1167 \def\dfncountersep{.}
1168 \def\@begindefinition#1#2{\trivlist
1169     \item[\hskip\labelsep{\bfseries #1\ #2.}]\upshape}
1170 \def\@opargbegindefinition#1#2#3{\trivlist
1171         \item[\hskip\labelsep{\bfseries #1\ #2\ (#3).}]\upshape}
1172 \def\@enddefinition{\endtrivlist}
1173
1174 \def\@begintheorem#1#2{\trivlist
1175     \let\baselinestretch\@blstr
1176     \item[\hskip \labelsep{\bfseries #1\ #2.}]\itshape}
1177 \def\@opargbegintheorem#1#2#3{\trivlist
1178     \let\baselinestretch\@blstr
1179         \item[\hskip \labelsep{\bfseries #1\ #2\ (#3).}]\itshape}
1180
1181 \def\newproof#1{%
1182     \@ifnextchar[{\@oprf{#1}}{\@nprf{#1}}}
1183 \def\@nprf#1#2{%
1184     \@ifnextchar[{\@xnprf{#1}{#2}}{\@ynprf{#1}{#2}}}
1185 \def\@xnprf#1#2[#3]{%
1186     \expandafter\@ifdefinable\csname #1\endcsname
1187       {\@definecounter{#1}\@newctr{#1}[#3]%
1188       \expandafter\xdef\csname the#1\endcsname{%
1189         \expandafter\noexpand\csname the#3\endcsname \@prfcountersep
1190           \@prfcounter{#1}}%
1191       \global\@namedef{#1}{\@prf{#1}{#2}}%
1192       \global\@namedef{end#1}{\@endproof}}}
1193 \def\@ynprf#1#2{%
1194     \expandafter\@ifdefinable\csname #1\endcsname
1195       {\@definecounter{#1}%
1196       \expandafter\xdef\csname the#1\endcsname{\@prfcounter{#1}}%
1197       \global\@namedef{#1}{\@prf{#1}{#2}}%
1198       \global\@namedef{end#1}{\@endproof}}}
1199 \def\@oprf#1[#2]#3{%
1200     \@ifundefined{c@#2}{\@nocounterr{#2}}%
1201       {\expandafter\@ifdefinable\csname #1\endcsname
1202       {\global\@namedef{the#1}{\@nameuse{the#2}}%
1203     \global\@namedef{#1}{\@prf{#2}{#3}}%
1204     \global\@namedef{end#1}{\@endproof}}}}
1205 \def\@prf#1#2{%
1206     \refstepcounter{#1}%
1207     \@ifnextchar[{\@yprf{#1}{#2}}{\@xprf{#1}{#2}}}
1208 \def\@xprf#1#2{%
1209     \@beginproof{#2}{\csname the#1\endcsname}\ignorespaces}
1210 \def\@yprf#1#2[#3]{%
1211     \@opargbeginproof{#2}{\csname the#1\endcsname}{#3}\ignorespaces}
1212 \def\@prfcounter#1{\noexpand\arabic{#1}}
1213 \def\@prfcountersep{.}
1214 \def\@beginproof#1#2{\trivlist\let\baselinestretch\@blstr
```

```
1215      \item[\hskip \labelsep{\scshape #1.}]\rmfamily}
1216 \def\@opargbeginproof#1#2#3{\trivlist\let\baselinestretch\@blstr
1217        \item[\hskip \labelsep{\scshape #1\ (#3).}]\rmfamily}
1218 \def\@endproof{\endtrivlist}
1219 \newcommand*{\qed}{\hbox{}\hfill$\Box$}
1220
1221 \@ifundefined{@biboptions}{\xdef\@biboptions{numbers}}{}
1222 \InputIfFileExists{\jobname.spl}{}{}
1223 \ifnonatbib\relax\else
1224    \RequirePackage[\@biboptions]{natbib}
1225 \fi
1226 \newwrite\splwrite
1227 \immediate\openout\splwrite=\jobname.spl
1228 \def\biboptions#1{\def\next{#1}\immediate\write\splwrite{%
1229     \string\g@addto@macro\string\@biboptions{%
1230      ,\expandafter\strip@prefix\meaning\next}}}
1231
1232 \let\baselinestretch=\@blstr
```

7   Page dimensions and margins for final form

7.1   Option 1p

```
1233 \ifnum\jtype=1
1234 \RequirePackage{geometry}
1235 \geometry{twoside,
1236   paperwidth=210mm,
1237   paperheight=297mm,
1238   textheight=562pt,
1239   textwidth=384pt,
1240   centering,
1241   headheight=50pt,
1242   headsep=12pt,
1243   footskip=12pt,
1244   footnotesep=24pt plus 2pt minus 12pt,
1245 }
1246 \global\let\bibfont=\footnotesize
1247 \global\bibsep=0pt
1248 \if@twocolumn\global\@twocolumnfalse\fi
1249 %
```

7.2   Option '3p'

```
1250 \else\ifnum\jtype=3
1251 \RequirePackage{geometry}
1252 \geometry{twoside,
1253   paperwidth=210mm,
1254   paperheight=297mm,
1255   textheight=622pt,
1256   textwidth=468pt,
1257   centering,
1258   headheight=50pt,
1259   headsep=12pt,
1260   footskip=18pt,
1261   footnotesep=24pt plus 2pt minus 12pt,
```

```
1262    columnsep=2pc
1263  }
1264  \global\let\bibfont=\footnotesize
1265  \global\bibsep=0pt
1266  \if@twocolumn\input{fleqn.clo}\fi
```

7.3   Option '5p'

```
1267  \else\ifnum\jtype=5
1268  \RequirePackage{geometry}
1269  \geometry{twoside,
1270    paperwidth=210mm,
1271    paperheight=297mm,
1272    textheight=682pt,
1273    textwidth=522pt,
1274    centering,
1275  headheight=50pt,
1276    headsep=12pt,
1277    footskip=18pt,
1278    footnotesep=24pt plus 2pt minus 12pt,
1279    columnsep=18pt
1280  }%
1281  \global\let\bibfont=\footnotesize
1282  \global\bibsep=0pt
1283  \input{fleqn.clo}
1284  \global\@twocolumntrue
1285 %%
1286 %% End of option '5p'
1287 %%
1288  \fi\fi\fi
```

8   Other items

```
1289  \def\journal#1{\gdef\@journal{#1}}
1290  \let\@journal\@empty
1291  \newenvironment{frontmatter}{}{\maketitle}
1292
1293  \long\def\@makecaption#1#2{%
1294    \vskip\abovecaptionskip\footnotesize
1295    \sbox\@tempboxa{#1: #2}%
1296    \ifdim \wd\@tempboxa >\hsize
1297      #1: #2\par
1298    \else
1299      \global \@minipagefalse
1300      \hb@xt@\hsize{\hfil\box\@tempboxa\hfil}%
1301    \fi
1302    \vskip\belowcaptionskip}
1303
1304  \AtBeginDocument{\@ifpackageloaded{hyperref}
1305    {\def\@linkcolor{blue}
1306     \def\@anchorcolor{blue}
1307     \def\@citecolor{blue}
1308     \def\@filecolor{blue}
1309     \def\@urlcolor{blue}
1310     \def\@menucolor{blue}
```

```
1311    \def\@pagecolor{blue}
1312 \begingroup
1313   \@makeother\'%
1314   \@makeother\=%
1315   \edef\x{%
1316     \edef\noexpand\x{%
1317       \endgroup
1318       \noexpand\toks@{%
1319         \catcode 96=\noexpand\the\catcode`\noexpand\'\relax
1320         \catcode 61=\noexpand\the\catcode`\noexpand\=\relax
1321       }%
1322     }%
1323     \noexpand\x
1324   }%
1325 \x
1326 \@makeother\'
1327 \@makeother\=
1328 }{}}
1329 %%
1330 \def\appendixname{Appendix}
1331 \renewcommand\appendix{\par
1332   \setcounter{section}{0}%
1333   \setcounter{subsection}{0}%
1334   \setcounter{equation}{0}
1335   \gdef\thefigure{\@Alph\c@section.\arabic{figure}}%
1336   \gdef\thetable{\@Alph\c@section.\arabic{table}}%
1337   \gdef\thesection{\appendixname~\@Alph\c@section}%
1338   \@addtoreset{equation}{section}%
1339   \gdef\theequation{\@Alph\c@section.\arabic{equation}}%
1340   \addtocontents{toc}{\string\let\string\numberline\string\tmptocnumberline}{}{}
1341 }
1342
1343 %%%% \numberline width calculation for appendix.
1344 \newdimen\appnamewidth
1345 \def\tmptocnumberline#1{%
1346   \setbox0=\hbox{\appendixname}
1347   \appnamewidth=\wd0
1348   \addtolength\appnamewidth{2.5pc}
1349   \hb@xt@\appnamewidth{#1\hfill}
1350 }
1351
1352 %% Added for work with amsrefs.sty
1353
1354 \@ifpackageloaded{amsrefs}%
1355   {}
1356   {%\let\bibsection\relax%
1357   \AtBeginDocument{\def\cites@b#1#2,#3{%
1358     \begingroup[%
1359       \toks@{\InnerCite{#2}#1}%
1360       \ifx\@empty#3\@xp\@gobble\fi
1361       \cites@c#3%
1362 }}}}
1363 %%
1364 %% Added for avoiding clash with cleveref.sty
```

```
1365 \@ifpackageloaded{cleveref}%
1366  {}
1367  {\def\tnotetext[#1]#2{\g@addto@macro\@tnotes{%
1368     \refstepcounter{tnote}%
1369     \immediate\write\@auxout{\string\Newlabel{#1}{\thetnote}}
1370     \def\thefootnote{\ifcase\c@tnote\or$\star$\or$\star\star$\fi}%
1371     \footnotetext{#2}}}
1372 %%%
1373   \def\fntext[#1]#2{\g@addto@macro\@fnotes{%
1374     \refstepcounter{fnote}%
1375     \immediate\write\@auxout{\string\Newlabel{#1}{\thefnote}}
1376     \def\thefootnote{\thefnote}%
1377     \global\setcounter{footnote}{\c@fnote}%
1378     \footnotetext{#2}}}
1379 %%%
1380   \def\cortext[#1]#2{\g@addto@macro\@cornotes{%
1381     \refstepcounter{cnote}%
1382     \immediate\write\@auxout{\string\Newlabel{#1}{\thecnote}}
1383     \def\thefootnote{\ifcase\c@cnote\or$\ast$\or
1384     $\ast\ast$\fi}%
1385     \footnotetext{#2}}}
1386 }
1387
1388 \def\textmarker#1#2{\textcolor{#1}{#2}}%*%
1389 ⟨/class⟩
1390 %
```