

L^AT_EX 2_ε Document Styles for the University of Southampton File version v2.0, dated 2018/12/20

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1 Quickstart

This guide assumes you have installed MiKTeX or TeX live distributions. It also requires having the program "make" for producing the templates again.

The folder labelled tex-mf should be installed in your local tex files source or whatever your tex distro uses.

The Templates have been built for the Department of Electronics and Computer Science in the Faculty of Engineering and Physical Science at the University Of Southampton.

The basic settings for University, Faculty and School are explained in Section 6

If a user only wishes to change the file for their thesis it is probably easier to navigate to the class file labeled ecsthesis and change the department and faculty naming there. This will be located in the subdirectory where you unzipped the files under tex/latex/ecsdocs/

2 Description

These L^AT_EX 2_ε document classes are designed to produce thesis, mini-thesis, progress, project, report, GDP report and GDP summary report documents which conformed to the University of Southampton guidelines of April 2001. They were updated in Jan 2019 to conform to changes in those guidelines. Specifically copy-right and authorship declaration changes. They are based on the document class `book`, but modify some of its layout decisions. An article class is also provided which is based on the document class `article`.

3 The DOCSTRIP modules

The following modules are used in the implementation to direct DOCSTRIP when generating the external files:

thesis	produce the ecsthesis document class
minithesis	produce the ecsminithesis document class
progress	produce the ecsprogress document class
project	produce the ecsproject document class
report	produce the ecsreport document class
article	produce the ecsarticle document class
gdp	produce the ecsgdp document class
gdpsummary	produce the ecsgdpsummary document class
testthesis	produce an example thesis
testminithesis	produce an example minithesis
testprogress	produce an example progress
testproject	produce an example project
testreport	produce an example report
testarticle	produce an example article
testgdp	produce an example GDP report
testgdpsummary	produce an example GDP summary report
introduction	produce an example introduction chapter
conclusions	produce an example conclusions chapter
appendix	produce an example appendix chapter
figure	produce an example figure file
definitions	produce an example definitions file
references	produce an example references file
bst	produce a bibliography style file
driver	produce a documentation driver file

4 Implementation

The checksum is to determine if there has been a truncation in the file during transmission over a network

The class has a custom option to define what colours should be used for links. This option defines **sotoncolour** to use UoS palette colours. Colour Code taken from <http://edshare.soton.ac.uk/10481>

All options are passed on to the **book** or **article** class.

```
1 <{*thesis | minithesis | progress | project | report | article | gdp | gdpsummary}>
```

```
\baseclass
```

```
2 %% ----- Class/Formating Adjustment -----
3 %% Adjust the book class to match the requirements
4 %% Set spacing, line and paragraph options
5 %% Set LaTeX builder options (work break penalties etc.)
6 <{*thesis | minithesis | progress | project | report | gdp | gdpsummary}>
7 \def\baseclass{book}
8 </thesis | minithesis | progress | project | report | gdp | gdpsummary>
9 <{*article}>
10 \def\baseclass{article}
11 </article>

12 \RequirePackage{xcolor}
13 \colorlet{linkBlue}{blue}
14 \colorlet{custGray}{gray}
15 \colorlet{chapRed}{red}
```

```

16 \DeclareOption{sotoncolour}{
17 \definecolor{sotonMarineBlue}{RGB}{1,67,89} % Soton marine blue (P 7469C)
18 \definecolor{sotonGrey}{RGB}{153,153,166} % Soton grey (P 443C)
19 \definecolor{sotonRed}{RGB}{171,18,16} % Soton Red (P 484C)
20 \colorlet{linkBlue}{sotonMarineBlue}
21 \colorlet{custGray}{sotonGrey}
22 \colorlet{chapRed}{sotonRed}
23 }
24 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{\baseclass}}

```

`\@checkoptions` Before we can process the options we must deal with a small problem. That is, we want to change the default options of the `book` or `article` class to `a4paper` and `11pt` or `12pt` but the macro `\ProcessOptions` used by the `book` or `article` class processes the options in the order specified in the file. Because `a4paper` is the first of the paper sizing options it will be overridden by any user defined option. But the same is not true of the font size option `11pt` or `12pt`. To remedy this we define a macro `\@checkoptions{<default>}{<option-list>}` which checks to see if any options in `<option-list>` have been specified and if not adds `<default>` to the option list.

```

25 \def\@checkoptions#1#2{
26   \edef\@curroptions{\@optionlist{\@currname.\@current}}
27   \@tempswafalse
28   \@tfor\@this:=#2\do{
29     \@expandtwoargs\in@{,\@this,}{,\@curroptions,}
30     \ifin@ \@tempswatrue \@break@tfor \fi
31     \let\@this\@empty
32     \if@tempswa \else \PassOptionsToClass{#1}{\baseclass}\fi
33 }

```

With this macro at our disposal we can continue to process the options

```

34 <*thesis | minithesis | progress | report | article | gdp | gdpsummary>
35 \@checkoptions{11pt}{10pt}{11pt}{12pt}
36 </thesis | minithesis | progress | report | article | gdp | gdpsummary>
37 <*project>
38 \@checkoptions{12pt}{10pt}{11pt}{12pt}
39 </project>
40 \PassOptionsToClass{a4paper}{\baseclass}
41 \ProcessOptions\relax

```

and load the `book` or `article` document class with `A4` as the default paper size.

```

42 \LoadClass{\baseclass}

```

4.1 Banner

`\bhrule` Provide a function to produce a banner on the output making the location of the current section simpler.

```

43 \newcommand\bhrule{\typeout{-----}}
44 \newcommand\btypeout[1]{\bhrule\typeout{\space #1}\bhrule}

```

4.2 Date

`\today` This macro uses the \TeX primitives `\month`, `\day` and `\year` to provide the date of the \LaTeX -run in a suitable format.

```
45 <*thesis>
46 \def\today{\ifcase\month\or
47   January\or February\or March\or April\or May\or June\or
48   July\or August\or September\or October\or November\or December\fi
49   \space \number\year}
50 </thesis>
```

5 Document Layout

5.1 Font

```
51 %% \usepackage[T1]{fontspec}
52 %   Set font for copyright statement body text
53 \usepackage[defaultsans]{droidsans}
54 %   Set a particular style of font for the thesis. A font that has smallcaps
55 \usepackage{mathpazo}
56 %%\usepackage[T1]{fontenc} %This may not be necessary for english only text
```

5.2 Spacing

Load the `setspace` package so that spacing can easily be set. The text in all three styles is set to one and a half spacing, paragraphs not indented, and a newline between paragraphs.

```
57 \usepackage{setspace}
58 <thesis | minithesis | progress | project | report | gdp | gdpsummary>\onehalfspacing
59 <article>\singlespacing
60 \setlength{\parindent}{0pt}
61 \setlength{\parskip}{2.0ex plus0.5ex minus0.2ex}
```

5.3 Margins

Load the `vmargin` package to setup the page dimensions.

```
62 \usepackage{vmargin}
63 <*thesis | minithesis | progress | project | report | gdp | gdpsummary>
64 \setmarginsrb          { 1.5in} % left margin
65                        { 0.6in} % top margin
66                        { 1.0in} % right margin
67                        { 0.8in} % bottom margin
68                        { 20pt}  % head height
69                        {0.25in} % head sep
70                        { 9pt}   % foot height
71                        { 0.3in} % foot sep
72 </thesis | minithesis | progress | project | report | gdp | gdpsummary>
73 <*article>
74 \setmarginsrb          { 0.8in} % left margin
75                        { 0.6in} % top margin
76                        { 0.8in} % right margin
77                        { 0.8in} % bottom margin
78                        { 20pt}  % head height
```

```

79 {0.25in} % head sep
80 { 9pt} % foot height
81 { 0.3in} % foot sep
82 </article>

```

5.4 Breaks

Control how pages and lines are broken.

```

83 \raggedbottom
84 \setlength{\topskip}{1\topskip \@plus 5\p@}
85 \doublehyphendemerits=10000 % No consecutive line hyphens.
86 \brokenpenalty=10000 % No broken words across columns/pages.
87 \widowpenalty=9999 % Almost no widows at bottom of page.
88 \clubpenalty=9999 % Almost no orphans at top of page.
89 \interfootnotelinepenalty=9999 % Almost never break footnotes.

```

5.5 Fancy Page Headers

Setup the the default fancy page headers with an underlined header containing chapter, name and page number.

```

90 \usepackage{fancyhdr}
91 % Help from https://texblog.org/2007/11/07/headerfooter-in-latex-with-fancyhdr/#comment-4783
92 \fancyhead[LE]{\textrm\thepage}
93 \fancyhead[LO]{\fancyplain{}{\textsl{\rightmark}}}}
94 \fancyhead[RE]{\fancyplain{}{\textsl{\leftmark}}}}
95 \fancyhead[RO]{\textrm\thepage}
96 \chead{}\lfoot{}\rfoot{}\cfoot{}
97 \pagestyle{fancy}
98 \fancypagestyle{plain}{
99   \fancyhf{}
100   \fancyhead[OR]{\thepage}
101   \renewcommand{\headrulewidth}{0pt}
102 }

```

<pre> \chaptermark \sectionmark \subsectionmark </pre>	<pre> Redefine chaptermark and sectionmark to set up the correct header name and produce a banner on the output making the location of messages simpler. The \btypeout command is for console logging where chapters start \chapapp expands to "Chapter" or "Appendix" </pre>
--	---

```

103 <thesis | minithesis | progress | project | report | gdp>
104 \renewcommand{\chaptermark}[1]{\btypeout{\thechapter.\space #1}\markboth{\chaptername\ \thechapter}{\thechapter}}
105 \renewcommand{\sectionmark}[1]{\markright{\thesection.\hspace{1em}#1}}
106 \renewcommand{\subsectionmark}[1]{}
107 </thesis | minithesis | progress | project | report | gdp>
108 <*article>
109 \renewcommand{\sectionmark}[1]{\btypeout{\thesection\hspace{1em}}\markboth{}{\thesection.\hspace{1em}#1}}
110 \renewcommand{\subsectionmark}[1]{}
111 \renewcommand{\subsubsectionmark}[1]{}
112 </article>
113 \gdpsummary\markboth{GDP Summary Report}{GDP Summary Report}

```

<pre> \cleardoublepage </pre>	<pre> Redefine cleardoublepage to remove headers from blank pages in twosided documents. </pre>
-------------------------------	---

```

114 \def\cleardoublepage{\clearpage\if@twoside \ifodd\c@page\else
115 \hbox{}
116 \thispagestyle{empty}
117 \newpage
118 \if@twocolumn\hbox{}\newpage\fi\fi\fi}

```

`\cleartoeven` Define `cleartoeven` to remove headers from blank pages and force to even page for appendix or index.

```

119 \def\cleartoeven{\clearpage\if@twoside \ifodd\c@page
120 \hbox{}
121 \thispagestyle{empty}
122 \newpage
123 \if@twocolumn\hbox{}\newpage\fi\fi\fi}

```

5.6 Mathematics

Load the `amsmath` packages, so we can do some serious math, and setup the theorem environments.

```

124 %% ----- Figure/Table/Equation/Listing Styling -----
125 %% Set the styling for non text elements of the document
126 \usepackage{amsmath,amsfonts,amssymb,amscd,amsthm,xspace}
127 \theoremstyle{plain}
128 \newtheorem{example}{Example}[chapter]
129 \newtheorem{theorem}{Theorem}[chapter]
130 \newtheorem{lemma}{Lemma}[chapter]
131 \newtheorem{proposition}{Proposition}[chapter]
132 \newtheorem{axiom}{Axiom}[chapter]
133 \newtheorem{definition}{Definition}[chapter]
134 \newtheorem{remark}{Remark}[chapter]
135 \newtheorem{corollary}{Corollary}[chapter]
136 \newtheorem{lemma}{Lemma}[chapter]
137 \newtheorem{proposition}{Proposition}[chapter]
138 \newtheorem{axiom}{Axiom}[chapter]
139 \newtheorem{definition}{Definition}[chapter]
140 \newtheorem{remark}{Remark}[chapter]
141 \newtheorem{corollary}{Corollary}[chapter]
142 \newtheorem{lemma}{Lemma}[chapter]
143 \newtheorem{proposition}{Proposition}[chapter]

```

5.7 Captions

`\fref` Load the `caption2` package to improve formatting of captions, and provide short
`\tref` referencing commands.

```

\eref 144 \usepackage[justification=centerlast,font=small,labelfont=sc]{caption}
\cref 145 \setlength{\captionmargin}{20pt}
\sref 146 \newcommand{\fref}[1]{Figure~\ref{#1}}
\aref 147 \newcommand{\tref}[1]{Table~\ref{#1}}
148 \newcommand{\eref}[1]{Equation~\ref{#1}}
149 \newcommand{\cref}[1]{Chapter~\ref{#1}}
150 \newcommand{\sref}[1]{Section~\ref{#1}}
151 \newcommand{\aref}[1]{Appendix~\ref{#1}}

```

5.8 Float Placement

`\topfraction` Preventing figures from appearing on a page by themselves. L^AT_EX's figure placement algorithm is quite biased in favour of putting figures on a page by themselves, instead of on the top of a page with some text below it. Fortunately, the parameters of the algorithm can be changed. The main problem is that L^AT_EX per default only allows a part of the top of a text-page (70%) to contain figures, and requires at least 20% of a page to be text when text and figures share a page. These parameters should be set to more reasonable values, for example 85% and 10%.

```
152 \renewcommand{\topfraction}{0.85}
153 \renewcommand{\bottomfraction}{.85}
154 \renewcommand{\textfraction}{0.1}
155 \renewcommand{\dbltopfraction}{.85}
```

`\floatpagefraction` This helps, but sometimes L^AT_EX puts a figure on a page by itself, although it would fit perfectly well on the top of a page. This happens when the figure will not fit on the page where it was defined. L^AT_EX then attempts to put it on a figures-only page before it attempts to put it at the top of the next page. A page may contain figures alone if the figure(s) use at least half the page. To prevent half-empty pages this limit should probably be increased to around 75%.

```
156 \renewcommand{\floatpagefraction}{0.75}
157 \renewcommand{\dblfloatpagefraction}{.75}
```

Be careful not to make `floatpagefraction` larger than `topfraction`, then you risk to produce a figure that can neither go on the top of a text page, nor on a page by itself. If that happens, the figure and all later figures will be postponed until next time a `clearpage` is executed (typically at the end of a chapter or the end of the document). This will also happen if a figure is too large to fit on a page.

```
158 \setcounter{topnumber}{9}
159 \setcounter{bottomnumber}{9}
160 \setcounter{totalnumber}{20}
161 \setcounter{dbltopnumber}{9}
```

5.9 Graphics

Load the `graphicx` package, so we can include pictures easily. Load the `epstopdf`, so that eps files are automatically converted to pdf when pdfL^AT_EX is used. This requires a version of *epstopdf* to be installed on you system. You can find a windows version at

<http://www.ctan.org/tex-archive/support/epstopdf/epstopdf.exe>.

```
162 \usepackage{graphicx}
163 \usepackage{epstopdf}
```

5.10 Subfigures and subtables

Load the `subfigure` package, so we can include subfigures easily.

```
164 \usepackage[scriptsize]{subfigure}
165 \usepackage{booktabs}
166 \usepackage{rotating}
```

5.11 Listings

Load the listings package, so we can include listings easily.

```
167 \usepackage{listings}
168 % \usepackage{lstpatch}
169 \lstset{captionpos=b,
170         frame=tb,
171         basicstyle=\scriptsize\ttfamily,
172         showstringspaces=false,
173         keepspaces=true}
174 \lstdefinestyle{matlab} {
175     language=Matlab,
176     keywordstyle=\color{blue},
177     commentstyle=\color[rgb]{0.13,0.55,0.13}\em,
178     stringstyle=\color[rgb]{0.7,0,0} }
```

5.12 Hyperlinks

Load the hyperref package to provide hyperlinks in pdf and dvi documents.

```
179 \usepackage[pdfpagemode={UseOutlines},bookmarks=true,bookmarksopen=true,
180     bookmarksopenlevel=0,bookmarksnumbered=true,hypertextnames=false,
181     colorlinks,linkcolor={linkBlue},citecolor={linkBlue},urlcolor={linkBlue},
182     pdfstartview={FitV},unicode,breaklinks=true]{hyperref}
183 \pdfstringdefDisableCommands{
184     \let\\\space
185 }
```

6 Internal Names

<code>\supervisor</code>	The various elements of the documents are defined as control sequences to make
<code>\examiner</code>	it easy to customize this style for other parts of the University.
<code>\degree</code>	186 %% ----- Organisational Structure -----
<code>\authors</code>	187 \newcommand*{\supervisor}[1]{\def\supname{#1}}
<code>\addresses</code>	188 \newcommand*{\examiner}[1]{\def\examname{#1}}
<code>\university</code>	189 \newcommand*{\degree}[1]{\def\degreename{#1}}
<code>\UNIVERSITY</code>	190 \newcommand*{\authors}[1]{\def\authornames{#1}}
<code>\department</code>	191 \newcommand*{\qualifications}[1]{\def\quals{#1}}
<code>\DEPARTMENT</code>	192 \newcommand*{\addresses}[1]{\def\addressnames{#1}}
<code>\group</code>	193 \newcommand*{\doi}[1]{\def\doicode{#1}}
<code>\GROUP</code>	194 \newcommand*{\volume}[2]{\def\volno{#1}\def\volof{#2}}
<code>\faculty</code>	195 \newcommand*{\orcidid}[1]{\def\orcid{#1}}
<code>\FACULTY</code>	196 \newcommand*{\university}[1]{\def\univname{#1}}
<code>\subject</code>	197 \newcommand*{\UNIVERSITY}[1]{\def\UNIVNAME{#1}}
<code>\keywords</code>	198 \newcommand*{\department}[1]{\def\deptname{#1}}
	199 \newcommand*{\DEPARTMENT}[1]{\def\DEPTNAME{#1}}
	200 \newcommand*{\group}[1]{\def\groupname{#1}}
	201 \newcommand*{\GROUP}[1]{\def\GROUPNAME{#1}}
	202 \newcommand*{\faculty}[1]{\def\facname{#1}}
	203 \newcommand*{\FACULTY}[1]{\def\FACNAME{#1}}
	204 \newcommand*{\subject}[1]{\def\subjectname{#1}}
	205 \newcommand*{\keywords}[1]{\def\keywordnames{#1}}

`\supname` The internal names of the elements are set to defaults appropriate to the Department of Electronics and Computer Science.
`\examname`
`\degreename` By running these commands at the top of your tex file it will overwrite the defaults.
`\authornames`
`\univname` 206 %% ----- Organisational Structure -----
`\UNIVNAME` 207 \doi{}
`\deptname` 208 \supervisor {}
`\DEPTNAME` 209 \examiner {}
`\groupname` 210 \degree {}
`\GROUPNAME` 211 \authors {}
`\facname` 212 \qualifications{}
`\FACNAME` 213 \orcidid{}
`\volume{}{}` 214
`\subjectname` 215 \university {\texorpdfstring{\href{http://www.southampton.ac.uk}}
`\keywordnames` 216 {University of Southampton}}
217 {University of Southampton}}
218 \UNIVERSITY {\MakeUppercase{\univname}}
219 \department {School of Electronics and Computer Science}
220 \DEPARTMENT {\MakeUppercase{\deptname}}
221 \group {Cyber Physical Systems Group}
222 \GROUP {\MakeUppercase{\groupname}}
223 \faculty {Faculty of Engineering and Physical Science}
224 \FACULTY {\MakeUppercase{\facname}}
225 \addresses {}
226 \subject {}
227 \keywords {}

7 Special Pages

7.1 Title Page

`\maketitle` Setup an appropriate title page and pdf strings if we are using pdfL^AT_EX.
The itletempty has been removed
Possibly the relax statement also needs to be removed
228 <{*thesis | minithesis | progress | project | report | gdp | gdpsummary}>
229 \usepackage{titling}
230 \AtBeginDocument{
231 \hypersetup{pdftitle={\thetitle}}
232 \hypersetup{pdfsubject={\subjectname}}
233 \hypersetup{pdfauthor={\authornames}}
234 \hypersetup{pdfkeywords={\keywordnames}}
235 }
236 \renewcommand\maketitle{
237 \btypeout{Title Page}
238 \thispagestyle{empty}
239 \begin{titlepage}
240 \let\footnotesize\small
241 \let\footnoterule\relax
242 \let \footnote \thanks
243 \setcounter{footnote}{0}
244 \null\vfil
245 \vskip 60\p@

```

246 \begin{center}
247 \setlength{\parskip}{0pt}
248 {\scshape\LARGE\textbf{\univname}\par}
249 %% TODO: Change all the descriptions to italic like the Thesis one
250 (*thesis | minithesis | progress | project | gdp | gdpsummary)
251 \bigskip
252 {\large \facname \par}
253 (/thesis | minithesis | progress | project | gdp | gdpsummary)
254 (*thesis | minithesis | progress | project)
255 {\large \deptname \par}
256 (/thesis | minithesis | progress | project)
257 \vfill
258 (*minithesis)
259 {\large A mini-thesis submitted for transfer from}
260 {\large MPhil to PhD \par}
261 (/minithesis)
262 (*progress)
263 {\large A progress report submitted for continuation}
264 {\large towards a PhD \par}
265 (/progress)
266 (*project)
267 {\large A project report submitted for the}
268 {\large award of \par \degreename \par}
269 (/project)
270 (*gdp)
271 {\large A group design project report submitted for}
272 {\large the award of \par \degreename \par}
273 (/gdp)
274 (*gdpsummary)
275 {\large A group design project summary report submitted}
276 {\large for the award of \par \degreename \par}
277 (/gdpsummary)
278 (*minithesis | progress | project | gdp | gdpsummary)
279 \vfill
280 {\normalsize Supervisor: \supname \par}
281 {\normalsize Examiner: \examname \par}
282 \vfill
283 \hspace{6mm}\parbox[t][51mm][s]{89mm}{
284 \center
285 \vfill
286 {\large \bf \@title \par}
287 \vfill
288 {\normalsize \textit{by} \textbf{\authornames \par}
289 \vfill
290 {\normalsize \@date \par}
291 \vfill
292 }
293 \parbox[t][95mm][s]{89mm}{
294 (/minithesis | progress | project | gdp | gdpsummary)
295 (*thesis | report)
296 {\huge \bf \@title \par}
297 }
298 \ifthenelse{equal{\doicode}{}}
299 {}

```

```

300     {\smallskip DOI: \href{http://orcid.org/\doicod}{\doicod}\par}
301     \ifthenelse{\equal{\volno}{}}{
302     {}
303     {\smallskip Volume \volno{} of \volof}
304     \vfill
305     {\LARGE \textit{by} \par}
306     \smallskip
307     {\LARGE \textbf{authornames}
308     \ifthenelse{\equal{\quals}{}}{
309     {}
310     {\par\LARGE
311     \quals}
312     \par}
313     \ifthenelse{\equal{\orcid}{}}{
314     {}
315     {\smallskip
316     ORCiD: \href{http://orcid.org/\orcid}{\orcid}}
317
318     \vfill
319     \<thesis>
320     {\large \textit{A thesis for the degree of} \par}
321     {\large \textit{Doctor of Philosophy} \par}
322     \</thesis>
323     \<report> {\large \textit{Technical Report} \par}
324     \bigskip
325     \bigskip
326     {\large \facname \par}
327     {\large \deptname \par}
328     \</report>
329     \bigskip
330     \bigskip
331     \bigskip
332     {\Large \@date \par}
333     \bigskip
334     \</thesis | report>
335     \end{center}
336     \par
337     \@thanks
338     \vfil\null
339     \end{titlepage}
340     \setcounter{footnote}{0}%
341     \global\let\thanks\relax
342     \global\let\maketitle\relax
343     \global\let\@thanks\@empty
344     \global\let\@author\@empty
345     \global\let\@date\@empty
346     \global\let\title\relax
347     \global\let\author\relax
348     \global\let\date\relax
349     \global\let\and\relax
350     \cleardoublepage
351 }
352 \</thesis | minithesis | progress | project | report | gdp | gdpsummary>
353 \<article>

```

```

354 \if@titlepage
355   \renewcommand\maketitle{
356     \btypeout{Title Page}
357     \markboth{\authornames}{\@title}
358     \begin{titlepage}
359       \thispagestyle{empty}
360       \let\footnotesize\small
361       \let\footnoterule\relax
362       \let \footnote \thanks
363       \null\vfil
364       \vskip 60\p@
365       \begin{center}
366         {\LARGE \@title \par}
367         \vskip 3em
368         {\large \lineskip .75em
369           \begin{tabular}[t]{c} \authornames \end{tabular}
370           \par}
371         \vskip 1em
372         {\large \lineskip .5em
373           \begin{tabular}[t]{c} \addressnames \end{tabular}
374           \par}
375         \vskip 1.5em
376         {\large \@date \par}
377         \if\keywordnames
378           \else
379             \quotation
380             \vskip 1.5em
381             {\noindent \normalsize
382               \textbf{Keywords:}
383               \textit{\keywordnames}
384               \par}
385             \endquotation
386           \fi
387       \end{center}
388       \par
389       \@thanks
390       \vfil\null
391     \end{titlepage}
392     \setcounter{footnote}{0}
393     \global\let\thanks\relax
394     \global\let\maketitle\relax
395     \global\let\@maketitle\relax
396     \global\let\@thanks\@empty
397     \global\let\@author\@empty
398     \global\let\@date\@empty
399     \global\let\title\relax
400     \global\let\author\relax
401     \global\let\date\relax
402     \global\let\and\relax
403   }
404 \else
405   \renewcommand\maketitle{
406     \btypeout{Title Page}
407     \markboth{\authornames}{\@title}

```

```

408 \thispagestyle{empty}
409 \par
410 \begingroup
411 \renewcommand\thefootnote{\@fnsymbol\c@footnote}
412 \def\@makefnmark{
413 \rlap{\@textsuperscript{\normalfont\@thefnmark}}
414 }
415 \long\def\@makefntext##1{
416 \parindent 1em\noindent \hb@xt@1.8em
417 {\hss\@textsuperscript{\normalfont\@thefnmark}}##1
418 }
419 \if@twocolumn
420 \ifnum \col@number=\@ne
421 \maketitle
422 \else
423 \twocolumn[\maketitle]%
424 \fi
425 \else
426 \newpage
427 % Prevent figures from going at top of page.
428 \global\@topnum\z@
429 \maketitle
430 \fi
431 \thispagestyle{plain}\@thanks
432 \endgroup
433 \setcounter{footnote}{0}%
434 \global\let\thanks\relax
435 \global\let\maketitle\relax
436 \global\let\@maketitle\relax
437 \global\let\@thanks\@empty
438 \global\let\@author\@empty
439 \global\let\@date\@empty
440 \global\let\title\relax
441 \global\let\author\relax
442 \global\let\date\relax
443 \global\let\and\relax
444 }
445 \def\@maketitle{
446 \newpage
447 \null
448 \vskip 2em
449 \begin{center}
450 \let \footnote \thanks
451 {\LARGE \@title \par}
452 \vskip 1.5em
453 {\large \lineskip .5em
454 \begin{tabular}[t]{c} \authornames \end{tabular}
455 \par}
456 \vskip 0.7em
457 {\large \lineskip .5em
458 \begin{tabular}[t]{c} \addressnames \end{tabular}
459 \par}
460 \vskip 1em
461 {\large \@date}

```

```

462 \end{center}
463 \par
464 \vskip 1.5em
465 }
466 \fi
467 \</article>

```

7.2 Abstract Page

`\abstract` Setup an appropriate abstract page.

```

468 <*thesis | minithesis | progress | project | report | gdp>
469 \newenvironment{abstract}
470 {
471   \btypeout{Abstract Page}
472   \thispagestyle{empty}
473   \null\vfil
474   \begin{center}
475     \setlength{\parskip}{0pt}
476     {\textsc\normalsize \univname \par}
477     \bigskip
478     {\underline{Abstract} \par}
479     \bigskip
480     {\textsc\normalsize \facname \par}
481 <*thesis | minithesis | progress | project | report>
482     {\textsc\normalsize \deptname \par}
483 </thesis | minithesis | progress | project | report>
484     \bigskip
485 <*thesis>
486     {\normalsize \underline{Doctor of Philosophy}\par}
487 </thesis>
488 <*minithesis>
489     {\normalsize \underline{A mini-thesis submitted for transfer from MPhil to PhD}\par}
490 </minithesis>
491 <*progress>
492     {\normalsize \underline{A progress report submitted for continuation towards a PhD}\par}
493 </progress>
494 <*project>
495     {\normalsize \underline{A project report submitted for the award of \degreename}\par}
496 </project>
497 <*gdp>
498     {\normalsize \underline{A group design project report submitted for the award of \degreename}\par}
499 </gdp>
500     \bigskip
501     {\normalsize\bf \@title \par}
502     \medskip
503     {\normalsize by \authornames \par}
504     \bigskip
505   \end{center}
506 }
507 {
508   \vfil\vfil\vfil\null
509   \cleardoublepage
510 }

```

```

511 </thesis | minithesis | progress | project | report | gdp>
512 <*article>
513 \if@titlepage
514   \renewenvironment{abstract}{
515     \titlepage
516     \null\vfil
517     \@beginparpenalty\@lowpenalty
518     \begin{center}
519       \bfseries \abstractname
520       \@endparpenalty\@M
521     \end{center}
522     \begin{itshape}
523     \noindent
524   }
525   {
526     \par
527     \end{itshape}
528     \if\keywordnames
529     \else
530       \quote
531       \vskip 1.5em
532       {\noindent \normalsize
533         \textbf{Keywords:}
534         \textit{\keywordnames}
535       \par}
536     \endquote
537     \fi
538     \vfil\null\endtitlepage
539   }
540 \else
541   \renewenvironment{abstract}{
542     \if@twocolumn
543       \section*{\abstractname}
544     \else
545       \small
546       \begin{center}
547         {\bfseries \abstractname\vspace{-.5em}\vspace{\z@}}
548       \end{center}
549       \quote
550     \fi
551     \begin{itshape}
552   }
553   {
554     \end{itshape}
555     \if\keywordnames
556     \else
557       \vskip 1.5em
558       {\noindent \normalsize
559         \textbf{Keywords:}
560         \textit{\keywordnames}
561       \par}
562     \fi
563     \if@twocolumn\else\endquote\fi
564   }

```

```

565 \fi
566 \>/article>

```

7.3 Contents Pages

7.3.1 Add to Table of Contents

Ensures numbering for sub-subsections in the table of contents, and provide for 6 levels to appear in toc. Define `addtotoc` to enable adding elements to the toc at chapter level, using a dummy counter to fix bookmarks in pdfL^AT_EXt.

```

567 <*thesis | minithesis | progress | project | report | gdp | article>
568 \addtocounter{secnumdepth}{1}
569 \setcounter{tocdepth}{6}
570 \newcounter{dummy}
571 \newcommand\addtotoc[1]{
572 \refstepcounter{dummy}
573 <*thesis | minithesis | progress | project | report | gdp>
574 \addcontentsline{toc}{chapter}{#1}}
575 </thesis | minithesis | progress | project | report | gdp>
576 <*article>
577 \addcontentsline{toc}{section}{#1}}
578 \>/article>

```

7.3.2 Table of Contents

```

\tableofcontents Adjust line and paragraph spacing.
579 \renewcommand\tableofcontents{
580 \hypersetup{linkcolor={black}}
581 \btypeout{Table of Contents}
582 \begin{spacing}{1}{
583     \setlength{\parskip}{1pt}
584     \if@twocolumn
585         \@restonecoltrue\onecolumn
586     \else
587         \@restonecolfalse
588     \fi
589 <*thesis | minithesis | progress | project | report | gdp>
590     \chapter*{\contentsname
591 </thesis | minithesis | progress | project | report | gdp>
592 <*article>
593     \section*{\contentsname
594 </article>
595         \@mkboth{
596             \MakeUppercase\contentsname}{\MakeUppercase\contentsname}}
597     \@starttoc{toc}
598     \if@restonecol\twocolumn\fi
599 <thesis | minithesis | progress | project | report | gdp> \cleardoublepage
600 } \end{spacing}
601 }

```

7.3.3 List of Figures

```

\listoffigures Adjust line and paragraph spacing.

```



```

602 \renewcommand\listoffigures{
603 \addtotoc{\listfigurename}
604 \begin{spacing}{1}{
605     \setlength{\parskip}{1pt}
606     \if@twocolumn
607         \@restonecoltrue\onecolumn
608     \else
609         \@restonecolfalse
610     \fi
611 <thesis | minithesis | progress | project | report | gdp>
612     \chapter*{\listfigurename
613 </thesis | minithesis | progress | project | report | gdp>
614 <*article>
615     \section*{\listfigurename
616 </article>
617     \@mkboth{\MakeUppercase\listfigurename}
618             {\MakeUppercase\listfigurename}}
619     \@starttoc{lof}
620     \if@restonecol\twocolumn\fi
621 <*thesis | minithesis | progress | project | report | gdp>
622     \cleardoublepage
623 </thesis | minithesis | progress | project | report | gdp>
624 }\end{spacing}
625 }

```

7.3.4 List of Tables

`\listoftables` Adjust line and paragraph spacing.

```

626 \renewcommand\listoftables{
627 \addtotoc{\listtablename}
628 \begin{spacing}{1}{
629     \setlength{\parskip}{1pt}
630     \if@twocolumn
631         \@restonecoltrue\onecolumn
632     \else
633         \@restonecolfalse
634     \fi
635 <*thesis | minithesis | progress | project | report | gdp>
636     \chapter*{\listtablename
637 </thesis | minithesis | progress | project | report | gdp>
638 <*article>
639     \section*{\listtablename
640 </article>
641     \@mkboth{
642         \MakeUppercase\listtablename}{\MakeUppercase\listtablename}}
643     \@starttoc{lot}
644     \if@restonecol\twocolumn\fi
645 <*thesis | minithesis | progress | project | report | gdp>
646     \cleardoublepage
647 </thesis | minithesis | progress | project | report | gdp>
648 }\end{spacing}
649 }

```

7.4 List of Symbols

`\listofsymbols` Provide a `listofsymbols` command to produce a list of symbols,

```

650 (*thesis | minithesis | progress | report | article)
651 \newcommand\listsymbolname{Definitions and Abbreviations}
652 </thesis | minithesis | progress | report | article>
653 (*project | gdp)
654 \newcommand\listsymbolname{List of Symbols}
655 </project | gdp>
656 \usepackage{longtable}
657 \newcommand\listofsymbols[2]{
658 \btypeout{\listsymbolname}
659 \addtotoc{\listsymbolname}
660 (*thesis | minithesis | progress | project | report | gdp)
661 \chapter*{\listsymbolname
662 </thesis | minithesis | progress | project | report | gdp>
663 (*article)
664 \section*{\listsymbolname
665 </article>
666 \mkboth{
667 \MakeUppercase\listsymbolname}{\MakeUppercase\listsymbolname}}
668 \begin{longtable}[c]{#1}#2\end{longtable}\par
669 (*thesis | minithesis | progress | project | report | gdp)
670 \cleardoublepage
671 </thesis | minithesis | progress | project | report | gdp>
672 }
673 </thesis | minithesis | progress | project | report | gdp | article>

```

7.5 Declaration of Authorship

`\authorshipdeclaration` Taken from Modified Template by Lovell TODO: Complete reference TODO: Consider a separate dissertation class for non technical? TODO: Provide extra argument for putting the date into the Declaration TODO: make slightly different declarations for theses and projects

This Authorship macro takes one argument for the case of People who have published part of their thesis already (perhaps in a paper).

xifthen else package used for the `isempty` command

```

674 (*thesis | minithesis | progress | report | article)
675 \usepackage{xifthen}
676 \newcommand\authorshipdeclaration[1]{
677 \btypeout{Declaration of Authorship}
678 \addtotoc{Declaration of Authorship}
679 \thispagestyle{plain}
680 \null\vfil
681 \vskip 60\p@
682 \begin{center}{\Large\bf Declaration of Authorship \par}\end{center}
683 I declare that this thesis and the work presented in it is my own and has
684 been generated by me as the result of my own original research.
685
686 I confirm that:
687
688 \begin{enumerate}
689 \item This work was done wholly or mainly while in candidature for a research degree at this U

```

```

690 \item Where any part of this thesis has previously been submitted for a degree or any other q
691 \item Where I have consulted the published work of others, this is always clearly attributed;
692 \item Where I have quoted from the work of others, the source is always given. With the except
693 \item I have acknowledged all main sources of help;
694 \item Where the thesis is based on work done by myself jointly with others, I have made clear
695
696 \ifthenelse{\isempty{#1}}
697 {\item None of this work has been published before submission}
698 {\item Parts of this work have been published as: #1}
699 \end{enumerate}
700
701 \vspace{15.0mm}
702 \begin{minipage}[t]{0.7\textwidth}
703   Signed:.....
704 \end{minipage}%
705 \begin{minipage}[t]{0.3\textwidth}
706   Date:.....
707 \end{minipage}
708 \vfil\vfil\null
709 \cleardoublepage
710 }
711 </thesis | minithesis | progress | report | article>

```

7.6 Copyright Statement

`\copyrightDeclaration` This standard Copyright statement is to be included for a theis submission to University of Southampton Digital Repository

```

712 <{*thesis}
713 \usepackage[export]{adjustbox} % for Soton logo alignment
714 \newcommand\copyrightDeclaration[1]{
715
716 \btypeout{Copyright declaration}
717 \thispagestyle{plain}
718
719 \hspace{-1.5in}\hspace{2.5cm}\begin{minipage}{17cm}
720 \null\vfil
721 \includegraphics[width=6cm,right]{ecsUoSLogo.png}
722
723 \vskip 60\p@
724 \begin{center}{\selectfont\huge
725 \textcolor{custGray}{University~of~Southampton~Research~Repository}\par}
726 \end{center}
727 \vspace{1cm}
728
729 {\fontfamily{fds}\selectfont
730
731 \noindent Copyright \textcopyright~ and Moral Rights for this thesis and, where
732 applicable, any accompanying data are retained by the author and/or other
733 copyright owners. A copy can be downloaded for personal non-commercial research
734 or study, without prior permission or charge. This thesis and the accompanying
735 data cannot be reproduced or quoted extensively from without first obtaining
736 permission in writing from the copyright holder/s. The content of the thesis
737 and accompanying research data (where applicable) must not be changed in any

```

```

738 way or sold commercially in any format or medium without the formal permission
739 of the copyright holder/s.
740
741 \vspace{0.5cm}
742
743 When referring to this thesis and any accompanying data, full bibliographic
744 details must be given, e.g.
745
746 \vspace{0.5cm}
747
748 Thesis: Author (Year of Submission) "Full thesis title", University of
749 Southampton, name of the University Faculty or School or Department,
750 PhD Thesis, pagination.
751
752 \vspace{0.5cm}
753
754 Data: Author (Year) Title. URI [dataset]]
755 \end{minipage}
756 \vfil\vfil\null
757 \cleardoublepage
758 }
759
760 \usepackage{lastpage} % counts the full number of pages
761
762 \thesis

```

7.7 Acknowledgements

`\acknowledgements` Thank someone!

```

763 \newcommand\acknowledgements[1]{
764 \btypeout{Acknowledgements}
765 \addtotoc{Acknowledgements}
766 \thesis | minithesis | progress | project | report | gdp
767 \thispagestyle{plain}
768 \null\vfil
769 \vskip 60\p@
770 \begin{center}{\Large\bf Acknowledgements \par}\end{center}
771 {\normalsize #1}
772 \vfil\vfil\null
773 \cleardoublepage
774 \thesis | minithesis | progress | project | report | gdp
775 \article
776 \section*{Acknowledgements}
777 {\normalsize #1}
778 \article
779 }

```

7.8 Dedicatory

`\dedicatory` Dedicate the document to someone!

```

780 \newcommand\dedicatory[1]{
781 \btypeout{Dedicatory}
782 \thesis | minithesis | progress | project | report | gdp

```

```

783 \thispagestyle{plain}
784 \null\vfil
785 \vskip 60\p@
786 \begin{center}{\Large \sl #1}\end{center}
787 \vfil\null
788 \cleardoublepage
789 </thesis | minithesis | progress | project | report | gdp>
790 }

```

8 Parts

`\frontmatter` Modify frontmatter.

```

791 <*article>
792 \newcommand\frontmatter{ }
793 </article>

```

`\mainmatter` Modify mainmatter.

```

794 <*article>
795 \newcommand\mainmatter{ }
796 </article>

```

`\backmatter` Modify backmatter to add the bibliography to the table of contents.

```

797 <*thesis | minithesis | progress | project | report | gdp>
798 \renewcommand\backmatter{
799   \if@openright
800     \cleardoublepage
801   \else
802     \clearpage
803   \fi
804   \addtotoc{\bibname}
805   \btypeout{\bibname}
806   \@mainmatterfalse}
807 </thesis | minithesis | progress | project | report | gdp>
808 <*article>
809 \newcommand\bibname{References}
810 \newcommand\backmatter{
811   \addtotoc{\bibname}
812   \btypeout{\bibname}
813 }
814 </article>

815 </thesis | minithesis | progress | project | report | article | gdp | gdpsummary>

```

9 Example Documents

```

816 <*testthesis>
817 \documentclass[sotoncolour]{ecsthesis}      % Use the Thesis Style with custom link colour
818 </testthesis>
819 <*testminithesis>
820 \documentclass[sotoncolour]{ecsmminithesis} % Use the minithesis Style with custom link colour
821 </testminithesis>

```

```

822 <*testprogress>
823 \documentclass[sotoncolour]{ecsprogress} % Use the progress Style with custom link colour
824 </testprogress>
825 <*testproject>
826 \documentclass[sotoncolour]{ecsproject} % Use the Project Style with custom link colour
827 </testproject>
828 <*testreport>
829 \documentclass[sotoncolour]{ecsreport} % Use the Report Style with custom link colour
830 </testreport>
831 <*testarticle>
832 \documentclass[sotoncolour]{ecsarticle} % Use the Article Style with custom link colour
833 </testarticle>
834 <*testgdp>
835 \documentclass[sotoncolour]{ecsgdp} % Use the GDP Report Style with custom link colour
836 </testgdp>
837 <*testgdpsummary>
838 \documentclass[sotoncolour]{ecsgdpsummary} % Use the GDP Summary Report Style with custom link colour
839 </testgdpsummary>
840 <*testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
841 \graphicspath{{../Figures/}} % Location of your graphics files
842 \usepackage{natbib} % Use Natbib style for the refs.
843 <*testthesis | testminithesis | testproject | testreport | testgdp>
844 \usepackage{bibentry} % Use bibentry for prepublished works
845 \nobibliography* % Use bibentry for prepublished works
846 </testthesis | testminithesis | testproject | testreport | testgdp>
847 \hypersetup{colorlinks=true} % Set to false for black/white printing
848 \input{Definitions} % Include your abbreviations
849 %% -----
850 %% -----THESIS/DOC INFORMATION -----
851 \title {An Investigation into \dots}
852 <*testthesis>
853 \authors {Steve R. Gunn} % Use of Soton Email unadvised, use ORCID instead.
854 </testthesis>
855 <*testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
856 \authors {\texorpdfstring
857 {\href{mailto:S.R.Gunn@ecs.soton.ac.uk}{Steve R. Gunn}}
858 {Steve R. Gunn}
859 }
860 </testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
861 \addresses {\groupname\\deptname\\univname}
862 \date {\today}
863 <*testminithesis | testprogress | testproject | testgdp | testgdpsummary>
864 \supervisor {Mr Beavis}
865 \examiner {Dr Butthead}
866 </testminithesis | testprogress | testproject | testgdp | testgdpsummary>
867 <*testproject>
868 \degree {BEng Electronic Engineering}
869 </testproject>
870 <*testgdp | testgdpsummary>
871 \degree {Master of Engineering}
872 </testgdp | testgdpsummary>
873 %% Optional Fields
874 <testthesis | testminithesis | testprogress> \qualifications{MEng PhD}
875 <*testthesis>

```

```

876 \orcidid{0000-0002-1825-0097}
877 \doi{10.1002/0470841559.ch1}
878 \volume{n}{m} %Optional Volume Numbering Volume n of m
879 \testthesis)
880 \subject {}
881 \keywords {}
882
883 \begin{document}
884 %% ----- FRONT MATTER ORGANISATION -----
885 (*testthesis)
886 \pagenumbering{gobble} % removes page number
887 \copyrightDeclaration{} % !!! Comment this line when printing the hardcopy !!!
888 \testthesis)
889 \frontmatter
890 \maketitle
891 \testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary)
892 (*testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp)
893 \begin{abstract}
894 This work is all about \dots
895 \end{abstract}
896 (*testthesis | testminithesis | testprogress | testproject | testreport | testgdp)
897 \tableofcontents
898 \listoffigures
899 \listoftables
900 %% The List of listings does not, by default, appear in the ToC, so....
901 \addtotoc{List of Listings}
902 \lstlistoflistings
903 \testthesis | testminithesis | testprogress | testproject | testreport | testgdp)
904 %%Lightweight Definitions and Abbreviations see package:nomencl for alternative
905 \listofsymbols{ll}{\w$ & The weight vector}
906 \testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp)
907 (*testthesis | testminithesis | testproject | testreport | testgdp)
908 %% ----- AUTHORSHIP DECLARATION/ ACKNOW. / DEDICATORY -----
909 %% Either include citations like below (as many as required spaced with commas or 'and').
910 %% \bibentry command must be used here with prepublished papers
911 % https://www.stefaanlippens.net/bibentry/
912 \authorshipdeclaration{\bibentry{Gunn:2001:pdflatex}, \bibentry{Lovell:2011:updated} and \bibentry{...}}
913 %% Or state no citations like below
914 %% \authorshipdeclaration{}
915 %% -----
916 \acknowledgements{Thanks to no one.}
917 \dedicatory{To \dots}
918 \testthesis | testminithesis | testproject | testreport | testgdp)
919 (*testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary)
920 \mainmatter
921 %% ----- MAIN MATTER (CONTENT) -----
922 \testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary)
923 (*testthesis | testminithesis | testprogress | testproject | testreport | testgdp)
924 \include{Introduction}
925 \include{Conclusions}
926 \begin{lstlisting}[caption=Without a title it doesn't appear in the table]
927 This is a test listing
928
929 It has several lines

```

```

930 That
931 say not much at all
932 \end{lstlisting}
933 \appendix
934 \include{AppendixA}
935 \backmatter
936 \bibliographystyle{ecs}
937 \bibliography{ECS}
938 </testthesis | testminithesis | testprogress | testproject | testreport | testgdp>
939 <*testgdpsummary>
940 \section*{Introduction}
941 \section*{Objectives}
942 \section*{Resources}
943 \section*{Constraints}
944 \section*{Approaching the task}
945 \section*{Team Organisation}
946 \section*{Important Results}
947 \section*{Conclusions}
948 \section*{Recommendations}
949 </testgdpsummary>
950 <*introduction>
951 \chapter{Introduction} \label{Chapter:Introduction}
952 </introduction>
953 <*testarticle>
954 \section{Introduction} \label{Section:Introduction}
955 </testarticle>
956 <*introduction | testarticle>
957 You probably found all the files from \cite{Gunn:2001:pdflatex}.
958 \tref{Table:tabex} illustrates the results of my work.
959 \begin{table}[!htb]
960   \centering
961   \begin{tabular}{cc}
962     \toprule
963     \textbf{Training Error} & \textbf{Testing Error}\\
964     \midrule
965     0 &  $\infty$ 
966     \bottomrule
967   \end{tabular}
968   \caption{The Results}
969   \label{Table:tabex}
970 \end{table}
971
972 \fref{Figure:figex} shows why this is the case.
973 \begin{figure}[!htb]
974   \centering
975   \includegraphics[width=8cm]{figure}
976   \caption{A colourful picture.}
977   \label{Figure:figex}
978 \end{figure}
979
980 This page shows you a subfigure example in \fref{Figure:figsubex}.
981 \begin{figure}[!htb]
982   \centering
983   \subfigure[The left caption]{

```



```

984     \includegraphics[width=4.2cm]{figure}
985     \label{Figure:figsubex:left}
986 }
987 \subfigure[The right caption]{
988     \includegraphics[width=4.2cm]{figure}
989     \label{Figure:figsubex:right}
990 }
991 \caption{A doubly colourful picture.}
992 \label{Figure:figsubex}
993 \end{figure}
994 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec rutrum sodales ligula, ac aliquam
995
996 Nulla molestie velit sed dui ullamcorper viverra. Fusce placerat vulputate lacus eu consequat. Aliquam
997
998 Nam egestas felis euismod erat tincidunt ornare. Nulla hendrerit tempor purus ac consequat. Aliquam
999
1000 Pellentesque sodales lobortis feugiat. Vivamus volutpat mauris id odio aliquam maximus sed sit amet
1001
1002 Donec vitae massa nisi. Praesent sed sollicitudin urna. Suspendisse vitae cursus tortor. In euismod
1003 </introduction | testarticle>
1004 < *conclusions>
1005 \chapter{Conclusions} \label{Chapter: Conclusions}
1006 </conclusions>
1007 < *testarticle>
1008 %% -----
1009 \section{Conclusions} \label{Section: Conclusions}
1010 </testarticle>
1011 < *conclusions | testarticle>
1012 It works.
1013 </conclusions | testarticle>
1014 < *testarticle>
1015 \acknowledgements{Thanks to no one.}
1016 \backmatter
1017 \bibliographystyle{ecs}
1018 \bibliography{ECS}
1019 \appendix
1020 </testarticle>
1021 < *appendix | testarticle>
1022 < *appendix>
1023 \chapter{Stuff} \label{Chapter: Stuff}
1024 </appendix>
1025 < *testarticle>
1026 %% -----
1027 \section{Stuff} \label{Section: Stuff}
1028 </testarticle>
1029 The following gets in the way of the text....
1030 </appendix | testarticle>
1031 < *testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
1032 \end{document}
1033 %% -----
1034 </testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>

```

9.1 Example Figure

```

1035 < *figure>

```

```

1036 %%BoundingBox: 0 150 600 650
1037 %%EndComments
1038 0.0 setlinewidth
1039 /length 0.1 def
1040 /width 0.02 def
1041 /hsvcircle {
1042   gsave
1043     /h 0.0 def
1044     0 4 360 {
1045       pop
1046       gsave
1047       0.5 0.0 translate
1048       newpath
1049       0.0 0.0 moveto
1050       length 0.0 lineto
1051       length width lineto
1052       0.0 width lineto
1053       closepath
1054       h 1.0 1.0 sethsbcolor
1055       fill
1056       grestore
1057       /h h 4 360 div add def
1058       4 rotate
1059     } for
1060   grestore
1061 } def
1062 0.0 setlinewidth
1063 0.0 setgray
1064 300 400 translate
1065 500 500 scale
1066 30 rotate
1067 1.0 0.7 scale
1068 -30 rotate
1069 hsvcircle
1070 0.8 0.8 scale
1071 hsvcircle
1072 0.8 0.8 scale
1073 hsvcircle
1074 0.8 0.8 scale
1075 hsvcircle
1076 0.8 0.8 scale
1077 hsvcircle
1078 0.8 0.8 scale
1079 hsvcircle
1080 0.8 0.8 scale
1081 hsvcircle
1082 showpage
1083 </figure>

```

9.2 Definitions File

```

1084 <*definitions>
1085 \newcommand{\BibTeX}{\rm B\kern-.05em{\sc i\kern-.025em b}\kern-.08em T\kern-.1667em\lower.7
1086
1087 %% People

```

```

1088 \newcounter{address}
1089 \setcounter{address}{1}
1090 \renewcommand{\theaddress}{\textsuperscript{\fnsymbol{address}}}
1091 \newcommand{\address}[1]{\refstepcounter{address}\theaddress#1\}
1092 \newcommand{\Name}[3]{\texorpdfstring{\href{mailto:#3}{#2}#1}{#2}\xspace}
1093 \newcommand{\SteveRGunn}[1]{\Name{#1}{Steve R. Gunn}{S.R.Gunn@ecs.soton.ac.uk}}
1094
1095 %% Dingbats
1096 \newcommand{\tick}{\ding{51}}
1097 \newcommand{\cross}{\ding{55}}
1098
1099 %% Calculus
1100 \newcommand{\pd}[2]{\ensuremath{\frac{\partial #1}{\partial #2}}\xspace}
1101 \newcommand{\fd}[2]{\ensuremath{\frac{d #1}{d #2}}\xspace}
1102 \newcommand{\dint}{\ensuremath{\int\!'\!\!\int}\xspace}
1103 \newcommand{\tint}{\ensuremath{\int\!'\!\!\int\!'\!\!\int}\xspace}
1104
1105 %% Math Sets
1106 \newcommand{\Q}[1]{\ensuremath{\mathbb{#1}}\xspace}
1107 \newcommand{\R}{\Q{\R}}
1108
1109 %% Matrix, Vector
1110 \newcommand{\V}[1]{\ensuremath{\boldsymbol{#1}}\xspace}
1111 \newcommand{\M}[1]{\ensuremath{\boldsymbol{#1}}\xspace}
1112 \newcommand{\0}{\V{0}}
1113 \newcommand{\1}{\V{1}}
1114 \newcommand{\I}{\M{I}}
1115
1116 %% Math Functions
1117 \newcommand{\F}[1]{\ensuremath{\mathrm{#1}}\xspace}
1118 \newcommand{\sgn}{\F{sgn}}
1119 \newcommand{\tr}{\F{trace}}
1120 \newcommand{\diag}{\F{diag}}
1121
1122 %% Math Names
1123 \newcommand{\N}[1]{\ensuremath{\mathit{#1}}\xspace}
1124
1125 %% Data
1126 \newcommand{\mc}[1]{\ensuremath{\mathcal{#1}}\xspace}
1127 \newcommand{\Hyp}{\mc{H}}
1128 \newcommand{\D}{\mc{D}}
1129
1130 %% Kernel
1131 \newcommand{\K}{\M{K}}
1132 \newcommand{\eins}{\texorpdfstring{\ensuremath{\epsilon}}{\textepsilon}-insensitive\xspace}
1133 \newcommand{\e}{\ensuremath{\epsilon}\xspace}
1134 \newcommand{\Bxi}{\ensuremath{\boldsymbol{\xi}}\xspace}
1135 \newcommand{\Kanova}{\ensuremath{\mathit{K}_{ANOVA}}\xspace}
1136 \newcommand{\Kspline}{\ensuremath{\mathit{K}_{spline}}\xspace}
1137
1138 %% Bayesian
1139 \newcommand{\MP}{\ensuremath{\mathit{\scriptscriptstyle M}\hspace{-1.5pt}P}}
1140 \newcommand{\ML}{\ensuremath{\mathit{\scriptscriptstyle M}\hspace{-1.5pt}L}}
1141 \newcommand{\Qw}{\ensuremath{Q_{\w}(\w)}\xspace}

```

```

1142 \newcommand{\Qa}{\ensuremath{Q_{\Ba}(\Ba)}\xspace}
1143 \newcommand{\Qb}{\ensuremath{Q_{\beta}(\beta)}\xspace}
1144 \newcommand{\wMPab}{\ensuremath{\w_{\MP|\bar{\Ba},\bar{\beta}}}\xspace}
1145 \newcommand{\wMP}{\ensuremath{\w_{\MP}}\xspace}
1146 \newcommand{\yMP}{\ensuremath{y_{\MP}}\xspace}
1147 \newcommand{\BaMP}{\ensuremath{\Ba_{\hspace{1pt}\MP}}\xspace}
1148 \newcommand{\aMP}{\ensuremath{\alpha_{\hspace{1pt}\MP}}\xspace}
1149 \newcommand{\bMP}{\ensuremath{\beta_{\hspace{1pt}\MP}}\xspace}
1150 \newcommand{\Sab}{\ensuremath{M_{\Sigma}_{\bar{\Ba},\bar{\beta}}}\xspace}
1151 \newcommand{\Ba}{\ensuremath{\boldsymbol{\alpha}}\xspace}
1152 \newcommand{\Bb}{\ensuremath{\boldsymbol{\beta}}\xspace}
1153 \newcommand{\Bm}{\ensuremath{\boldsymbol{\mu}}\xspace}
1154 \newcommand{\BL}{\ensuremath{\boldsymbol{\Lambda}}\xspace}
1155 \newcommand{\BPhi}{\ensuremath{\boldsymbol{\Phi}}\xspace}
1156 \newcommand{\SMP}{\ensuremath{M_{\Sigma}_{\MP}}\xspace}
1157
1158 \newcommand{\Pa}{\ensuremath{P(\alpha|\mathcal{H})}\xspace}
1159 \newcommand{\Pb}{\ensuremath{P(\beta|\mathcal{H})}\xspace}
1160 \newcommand{\Pab}{\ensuremath{P(\alpha,\beta|\mathcal{H})}\xspace}
1161 \newcommand{\Pw}{\ensuremath{P(\w|\mathcal{H})}\xspace}
1162 \newcommand{\PD}{\ensuremath{P(\mathcal{D}|\mathcal{H})}\xspace}
1163 \newcommand{\PWa}{\ensuremath{P(\w|\alpha,\mathcal{H})}\xspace}
1164 \newcommand{\PDIwb}{\ensuremath{P(\mathcal{D}|\w,\beta,\mathcal{H})}\xspace}
1165 \newcommand{\PDwab}{\ensuremath{P(\mathcal{D},\w,\alpha,\beta|\mathcal{H})}\xspace}
1166 \newcommand{\PDIw}{\ensuremath{P(\mathcal{D}|\w,\mathcal{H})}\xspace}
1167 \newcommand{\PWID}{\ensuremath{P(\w|\mathcal{D},\mathcal{H})}\xspace}
1168 \newcommand{\PWabID}{\ensuremath{P(\w,\alpha,\beta|\mathcal{D},\mathcal{H})}\xspace}
1169
1170 \newcommand{\PanH}{\ensuremath{P(\alpha)}\xspace}
1171 \newcommand{\PbnH}{\ensuremath{P(\beta)}\xspace}
1172 \newcommand{\PabnH}{\ensuremath{P(\alpha,\beta)}\xspace}
1173 \newcommand{\PwnH}{\ensuremath{P(\w)}\xspace}
1174 \newcommand{\PDnH}{\ensuremath{P(\mathcal{D})}\xspace}
1175 \newcommand{\PWIanH}{\ensuremath{P(\w|\alpha)}\xspace}
1176 \newcommand{\PDIwnH}{\ensuremath{P(\mathcal{D}|\w,\beta)}\xspace}
1177 \newcommand{\PDwabnH}{\ensuremath{P(\mathcal{D},\w,\Ba,\beta)}\xspace}
1178 \newcommand{\PDIwnH}{\ensuremath{P(\mathcal{D}|\w)}\xspace}
1179 \newcommand{\PWIDnH}{\ensuremath{P(\w|\mathcal{D})}\xspace}
1180 \newcommand{\PWabIDnH}{\ensuremath{P(\w,\alpha,\beta|\mathcal{D})}\xspace}
1181
1182 \newcommand{\PDwBab}{\ensuremath{P(\mathcal{D},\w,\Ba,\beta|\mathcal{H})}\xspace}
1183 \newcommand{\PWIBa}{\ensuremath{P(\w|\Ba,\mathcal{H})}\xspace}
1184 \newcommand{\PBab}{\ensuremath{P(\Ba,\beta|\mathcal{H})}\xspace}
1185 \newcommand{\PWabBID}{\ensuremath{P(\w,\Ba,\beta|\mathcal{D},\mathcal{H})}\xspace}
1186
1187 \newcommand{\PBanH}{\ensuremath{P(\Ba)}\xspace}
1188 \newcommand{\PWIBanH}{\ensuremath{P(\w|\Ba)}\xspace}
1189
1190 %% Snakes
1191 \newcommand{\Esnake}{\ensuremath{\mathit{E}_{\text{snake}}}\xspace}
1192 \newcommand{\Eimage}{\ensuremath{\mathit{E}_{\text{image}}}\xspace}
1193 \newcommand{\Econt}{\ensuremath{\mathit{E}_{\text{cont}}}\xspace}
1194 \newcommand{\Ecurv}{\ensuremath{\mathit{E}_{\text{curv}}}\xspace}
1195 \newcommand{\Eint}{\ensuremath{\mathit{E}_{\text{int}}}\xspace}

```

```

1196 \newcommand{\Eext}{\ensuremath{\mathit{E}_{\text{ext}}}\xspace}
1197 \newcommand{\Eterm}{\ensuremath{\mathit{E}_{\text{term}}}\xspace}
1198 \newcommand{\Eline}{\ensuremath{\mathit{E}_{\text{line}}}\xspace}
1199 \newcommand{\Edge}{\ensuremath{\mathit{E}_{\text{edge}}}\xspace}
1200 \newcommand{\Econ}{\ensuremath{\mathit{E}_{\text{con}}}\xspace}
1201 \newcommand{\Eangle}{\ensuremath{\mathit{E}_{\text{angle}}}\xspace}
1202 \newcommand{\Elshape}{\ensuremath{\mathit{E}_{\text{lshape}}}\xspace}
1203 \newcommand{\Edgedir}{\ensuremath{\mathit{E}_{\text{edgedir}}}\xspace}
1204 \newcommand{\Emodel}{\ensuremath{\mathit{E}_{\text{model}}}\xspace}
1205 \newcommand{\wte}{\ensuremath{\mathit{w}_{\text{term}}}\xspace}
1206 \newcommand{\wli}{\ensuremath{\mathit{w}_{\text{line}}}\xspace}
1207 \newcommand{\wed}{\ensuremath{\mathit{w}_{\text{edge}}}\xspace}
1208 \newcommand{\wco}{\ensuremath{\mathit{w}_{\text{con}}}\xspace}
1209
1210
1211 %% Environments
1212 \newcounter{alg}
1213 \newenvironment{algorithm}[1]
1214 {
1215     \stepcounter{alg}
1216     \begin{table}[htb]
1217     \centering
1218     \begin{tabular}[t]{l}
1219     \hline&
1220     \multicolumn{2}{l}{\bf Algorithm \arabic{alg}: #1}\&\&
1221 } {
1222     &\&
1223     \hline
1224     \end{tabular}
1225     \end{table}
1226 }
1227 </definitions>

```

9.3 References File

```

1228 <*references>
1229 @MISC{Gunn:2001:pdflatex,
1230   author = {S.R. Gunn},
1231   title = {PDFLaTeX Instructions},
1232   year = {2001},
1233   url = {http://www.ecs.soton.ac.uk/~srg/softwaretools/document/}
1234 }
1235 @MISC{Lovell:2011:updated,
1236   author = {C. J. Lovell},
1237   title = {Updated templates},
1238   year = {2011}
1239 }
1240 @MISC{Gunn:2011:updated2,
1241   author = {S.R. Gunn and C. J. Lovell},
1242   title = {Updated templates reference 2},
1243   year = {2011}
1244 }
1245
1246 </references>

```

9.4 Bibliography Style File

```
1247 (*bst)
1248 %% File: 'ecs.bst'
1249 %% A modification of 'plainnat.bst' for use with natbib package
1250 %%
1251 %% Copyright 1993-1999 Patrick W Daly
1252 %% Max-Planck-Institut f\"ur Aeronomie
1253 %% Max-Planck-Str. 2
1254 %% D-37191 Katlenburg-Lindau
1255 %% Germany
1256 %% E-mail: daly@linmpi.mpg.de
1257 %%
1258 %% This program can be redistributed and/or modified under the terms
1259 %% of the LaTeX Project Public License Distributed from CTAN
1260 %% archives in directory macros/latex/base/lppl.txt; either
1261 %% version 1 of the License, or any later version.
1262 %%
1263 %% Includes field URL for Internet addresses
1264 %%
1265 ENTRY
1266   { address
1267     author
1268     booktitle
1269     chapter
1270     edition
1271     editor
1272     howpublished
1273     institution
1274     isbn
1275     issn
1276     journal
1277     key
1278     month
1279     note
1280     number
1281     organization
1282     pages
1283     publisher
1284     school
1285     series
1286     title
1287     type
1288     url
1289     volume
1290     year
1291   }
1292   {}
1293   { label extra.label sort.label short.list }
1294
1295 INTEGERS { output.state before.all mid.sentence after.sentence after.block }
1296
1297 FUNCTION {init.state.consts}
1298 { #0 'before.all :=
```

```

1299 #1 'mid.sentence :=
1300 #2 'after.sentence :=
1301 #3 'after.block :=
1302 }
1303
1304 STRINGS { s t }
1305
1306 FUNCTION {output.nonnull}
1307 { 's :=
1308   output.state mid.sentence =
1309   { ", " * write$ }
1310   { output.state after.block =
1311     { add.period$ write$
1312       newline$
1313       "\newblock " write$
1314     }
1315     { output.state before.all =
1316       'write$
1317       { add.period$ " " * write$ }
1318     if$
1319   }
1320   if$
1321   mid.sentence 'output.state :=
1322 }
1323 if$
1324 s
1325 }
1326
1327 FUNCTION {output}
1328 { duplicate$ empty$
1329   'pop$
1330   'output.nonnull
1331   if$
1332 }
1333
1334 FUNCTION {output.check}
1335 { 't :=
1336   duplicate$ empty$
1337   { pop$ "empty " t * " in " * cite$ * warning$ }
1338   'output.nonnull
1339   if$
1340 }
1341
1342 FUNCTION {fin.entry}
1343 { add.period$
1344   write$
1345   newline$
1346 }
1347
1348 FUNCTION {new.block}
1349 { output.state before.all =
1350   'skip$
1351   { after.block 'output.state := }
1352   if$

```

```

1353 }
1354
1355 FUNCTION {new.sentence}
1356 { output.state after.block =
1357   'skip$
1358   { output.state before.all =
1359     'skip$
1360     { after.sentence 'output.state := }
1361     if$
1362   }
1363   if$
1364 }
1365
1366 FUNCTION {not}
1367 { { #0 }
1368   { #1 }
1369   if$
1370 }
1371
1372 FUNCTION {and}
1373 { 'skip$
1374   { pop$ #0 }
1375   if$
1376 }
1377
1378 FUNCTION {or}
1379 { { pop$ #1 }
1380   'skip$
1381   if$
1382 }
1383
1384 FUNCTION {new.block.checka}
1385 { empty$
1386   'skip$
1387   'new.block
1388   if$
1389 }
1390
1391 FUNCTION {new.block.checkb}
1392 { empty$
1393   swap$ empty$
1394   and
1395   'skip$
1396   'new.block
1397   if$
1398 }
1399
1400 FUNCTION {new.sentence.checka}
1401 { empty$
1402   'skip$
1403   'new.sentence
1404   if$
1405 }
1406

```



```

1407 FUNCTION {new.sentence.checkb}
1408 { empty$
1409   swap$ empty$
1410   and
1411   'skip$
1412   'new.sentence
1413   if$
1414 }
1415
1416 FUNCTION {field.or.null}
1417 { duplicate$ empty$
1418   { pop$ "" }
1419   'skip$
1420   if$
1421 }
1422
1423 FUNCTION {emphasize}
1424 { duplicate$ empty$
1425   { pop$ "" }
1426   { "{\em " swap$ * "}" * }
1427   if$
1428 }
1429
1430 INTEGERS { nameptr namesleft numnames }
1431
1432 FUNCTION {format.names}
1433 { 's :=
1434   #1 'nameptr :=
1435   s num.names$ 'numnames :=
1436   numnames 'namesleft :=
1437   { namesleft #0 > }
1438   { s nameptr "{ff~}{vv~}{ll}{, jj}" format.name$ 't :=
1439     nameptr #1 >
1440     { namesleft #1 >
1441       { ", " * t * }
1442       { numnames #2 >
1443         { "," * }
1444         'skip$
1445         if$
1446         t "others" =
1447           { " et~al." * }
1448           { " and " * t * }
1449         if$
1450       }
1451       if$
1452     }
1453     't
1454     if$
1455     nameptr #1 + 'nameptr :=
1456     namesleft #1 - 'namesleft :=
1457   }
1458   while$
1459 }
1460

```

```

1461 FUNCTION {format.key}
1462 { empty$
1463   { key field.or.null }
1464   { "" }
1465   if$
1466 }
1467
1468 FUNCTION {format.authors}
1469 { author empty$
1470   { "" }
1471   { author format.names }
1472   if$
1473 }
1474
1475 FUNCTION {format.editors}
1476 { editor empty$
1477   { "" }
1478   { editor format.names
1479     editor num.names$ #1 >
1480     { ", editors" * }
1481     { ", editor" * }
1482     if$
1483   }
1484   if$
1485 }
1486
1487 FUNCTION {format.isbn}
1488 { isbn empty$
1489   { "" }
1490   { new.block "ISBN " isbn * }
1491   if$
1492 }
1493
1494 FUNCTION {format.issn}
1495 { issn empty$
1496   { "" }
1497   { new.block "ISSN " issn * }
1498   if$
1499 }
1500
1501 %FUNCTION {format.url}
1502 %{ url empty$
1503 %   { "" }
1504 %   { new.block "URL \url{" url * "}" * }
1505 %   if$
1506 %}
1507 %
1508 %FUNCTION {format.title}
1509 %{ title empty$
1510 %   { "" }
1511 %   { title "t" change.case$ }
1512 %   if$
1513 %}
1514 FUNCTION {format.url}

```

```

1515 { ""
1516 }
1517
1518 FUNCTION {format.title}
1519 { title empty$
1520   { "" }
1521   { url empty$
1522     { title "t" change.case$ }
1523     { "\href{" url * "}{ " * title "t" change.case$ * "}" * }
1524     if$
1525   }
1526   if$
1527 }
1528
1529
1530 FUNCTION {format.full.names}
1531 {'s :=
1532   #1 'nameptr :=
1533   s num.names$ 'numnames :=
1534   numnames 'namesleft :=
1535   { namesleft #0 > }
1536   { s nameptr
1537     "{vv~}{ll}" format.name$ 't :=
1538     nameptr #1 >
1539     {
1540       namesleft #1 >
1541       { ", " * t * }
1542       {
1543         numnames #2 >
1544         { ", " * }
1545         'skip$
1546         if$
1547         t "others" =
1548         { " et~al." * }
1549         { " and " * t * }
1550         if$
1551       }
1552       if$
1553     }
1554     't
1555     if$
1556     nameptr #1 + 'nameptr :=
1557     namesleft #1 - 'namesleft :=
1558   }
1559   while$
1560 }
1561
1562 FUNCTION {author.editor.full}
1563 { author empty$
1564   { editor empty$
1565     { "" }
1566     { editor format.full.names }
1567     if$
1568   }

```

```

1569     { author format.full.names }
1570   if$
1571 }
1572
1573 FUNCTION {author.full}
1574 { author empty$
1575   { "" }
1576   { author format.full.names }
1577   if$
1578 }
1579
1580 FUNCTION {editor.full}
1581 { editor empty$
1582   { "" }
1583   { editor format.full.names }
1584   if$
1585 }
1586
1587 FUNCTION {make.full.names}
1588 { type$ "book" =
1589   type$ "inbook" =
1590   or
1591     'author.editor.full
1592   { type$ "proceedings" =
1593     'editor.full
1594     'author.full
1595     if$
1596   }
1597   if$
1598 }
1599
1600 FUNCTION {output.bibitem}
1601 { newline$
1602   "\bibitem[" write$
1603   label write$
1604   ")" make.full.names duplicate$ short.list =
1605     { pop$ }
1606     { * }
1607     if$
1608   "]" * write$
1609   cite$ write$
1610   "]" write$
1611   newline$
1612   ""
1613   before.all 'output.state :=
1614 }
1615
1616 FUNCTION {n.dashify}
1617 { 't :=
1618   ""
1619   { t empty$ not }
1620   { t #1 #1 substring$ "-" =
1621     { t #1 #2 substring$ "--" = not
1622       { "--" *

```

```

1623         t #2 global.max$ substring$ 't :=
1624     }
1625     { { t #1 #1 substring$ "-" = }
1626       { "-" *
1627         t #2 global.max$ substring$ 't :=
1628       }
1629     while$
1630   }
1631   if$
1632 }
1633 { t #1 #1 substring$ *
1634   t #2 global.max$ substring$ 't :=
1635 }
1636   if$
1637 }
1638 while$
1639 }
1640
1641 FUNCTION {format.date}
1642 { year duplicate$ empty$
1643   { "empty year in " cite$ * warning$
1644     pop$ "" }
1645   'skip$
1646   if$
1647   month empty$
1648     'skip$
1649     { month
1650       " " * swap$ *
1651     }
1652   if$
1653   extra.label *
1654 }
1655
1656 FUNCTION {format.btitle}
1657 { title emphasize
1658 }
1659
1660 FUNCTION {tie.or.space.connect}
1661 { duplicate$ text.length$ #3 <
1662   { "~" }
1663   { " " }
1664   if$
1665   swap$ * *
1666 }
1667
1668 FUNCTION {either.or.check}
1669 { empty$
1670   'pop$
1671   { "can't use both " swap$ * " fields in " * cite$ * warning$ }
1672   if$
1673 }
1674
1675 FUNCTION {format.bvolume}
1676 { volume empty$

```

```

1677 { "" }
1678 { "volume" volume tie.or.space.connect
1679   series empty$
1680   'skip$
1681   { " of " * series emphasize * }
1682   if$
1683   "volume and number" number either.or.check
1684 }
1685 if$
1686 }
1687
1688 FUNCTION {format.number.series}
1689 { volume empty$
1690   { number empty$
1691     { series field.or.null }
1692     { output.state mid.sentence =
1693       { "number" }
1694       { "Number" }
1695       if$
1696       number tie.or.space.connect
1697       series empty$
1698       { "there's a number but no series in " cite$ * warning$ }
1699       { " in " * series * }
1700       if$
1701     }
1702     if$
1703   }
1704   { "" }
1705   if$
1706 }
1707
1708 FUNCTION {format.edition}
1709 { edition empty$
1710   { "" }
1711   { output.state mid.sentence =
1712     { edition "l" change.case$ " edition" * }
1713     { edition "t" change.case$ " edition" * }
1714     if$
1715   }
1716   if$
1717 }
1718
1719 INTEGERS { multiresult }
1720
1721 FUNCTION {multi.page.check}
1722 { 't :=
1723   #0 'multiresult :=
1724   { multiresult not
1725     t empty$ not
1726     and
1727   }
1728   { t #1 #1 substring$
1729     duplicate$ "-" =
1730     swap$ duplicate$ "," =

```

```

1731     swap$ "+" =
1732     or or
1733     { #1 'multiresult := }
1734     { t #2 global.max$ substring$ 't := }
1735     if$
1736   }
1737   while$
1738   multiresult
1739 }
1740
1741 FUNCTION {format.pages}
1742 { pages empty$
1743   { "" }
1744   { pages multi.page.check
1745     { "pages" pages n.dashify tie.or.space.connect }
1746     { "page" pages tie.or.space.connect }
1747     if$
1748   }
1749   if$
1750 }
1751
1752 FUNCTION {format.vol.num.pages}
1753 { volume field.or.null
1754   number empty$
1755     'skip$
1756     { "\penalty0 (" number * ")" * *
1757       volume empty$
1758         { "there's a number but no volume in " cite$ * warning$ }
1759         'skip$
1760       if$
1761     }
1762   if$
1763   pages empty$
1764     'skip$
1765     { duplicate$ empty$
1766       { pop$ format.pages }
1767       { ":\penalty0 " * pages n.dashify * }
1768     if$
1769   }
1770   if$
1771 }
1772
1773 FUNCTION {format.chapter.pages}
1774 { chapter empty$
1775   'format.pages
1776   { type empty$
1777     { "chapter" }
1778     { type "1" change.case$ }
1779     if$
1780     chapter tie.or.space.connect
1781     pages empty$
1782     'skip$
1783     { ", " * format.pages * }
1784     if$

```

```

1785     }
1786     if$
1787 }
1788
1789 FUNCTION {format.in.ed.booktitle}
1790 { booktitle empty$
1791     { "" }
1792     { editor empty$
1793         { "In " booktitle emphasize * }
1794         { "In " format.editors * ", " * booktitle emphasize * }
1795         if$
1796     }
1797     if$
1798 }
1799
1800 FUNCTION {empty.misc.check}
1801 { author empty$ title empty$ howpublished empty$
1802     month empty$ year empty$ note empty$
1803     and and and and and
1804     key empty$ not and
1805     { "all relevant fields are empty in " cite$ * warning$ }
1806     'skip$
1807     if$
1808 }
1809
1810 FUNCTION {format.thesis.type}
1811 { type empty$
1812     'skip$
1813     { pop$
1814         type "t" change.case$
1815     }
1816     if$
1817 }
1818
1819 FUNCTION {format.tr.number}
1820 { type empty$
1821     { "Technical Report" }
1822     'type
1823     if$
1824     number empty$
1825     { "t" change.case$ }
1826     { number tie.or.space.connect }
1827     if$
1828 }
1829
1830 FUNCTION {format.article.crossref}
1831 { key empty$
1832     { journal empty$
1833         { "need key or journal for " cite$ * " to crossref " * crossref *
1834             warning$
1835             ""
1836         }
1837         { "In {\em " journal * "\/}" * }
1838         if$

```



```

1839     }
1840     { "In " key * }
1841     if$
1842     " \citep{" * crossref * "}" *
1843 }
1844
1845 FUNCTION {format.book.crossref}
1846 { volume empty$
1847   { "empty volume in " cite$ * "'s crossref of " * crossref * warning$
1848     "In "
1849   }
1850   { "Volume" volume tie.or.space.connect
1851     " of " *
1852   }
1853   if$
1854   editor empty$
1855   editor field.or.null author field.or.null =
1856   or
1857   { key empty$
1858     { series empty$
1859       { "need editor, key, or series for " cite$ * " to crossref " *
1860         crossref * warning$
1861         "" *
1862       }
1863       { "{\em " * series * "\/}" * }
1864     } if$
1865   }
1866   { key * }
1867   if$
1868 }
1869 'skip$
1870 if$
1871 ", \citet{" * crossref * "}" *
1872 }
1873
1874 FUNCTION {format.incoll.inproc.crossref}
1875 { editor empty$
1876   editor field.or.null author field.or.null =
1877   or
1878   { key empty$
1879     { booktitle empty$
1880       { "need editor, key, or booktitle for " cite$ * " to crossref " *
1881         crossref * warning$
1882         ""
1883       }
1884       { "In {\em " booktitle * "\/}" * }
1885     } if$
1886   }
1887   { "In " key * }
1888   if$
1889 }
1890 { "In " }
1891 if$
1892 " \citet{" * crossref * "}" *

```

```

1893 }
1894
1895 FUNCTION {article}
1896 { output.bibitem
1897   format.authors "author" output.check
1898   author format.key output
1899   new.block
1900   format.title "title" output.check
1901   new.block
1902   crossref missing$
1903     { journal emphasize "journal" output.check
1904       format.vol.num.pages output
1905       format.date "year" output.check
1906     }
1907     { format.article.crossref output.nonnull
1908       format.pages output
1909     }
1910   if$
1911   format.issn output
1912   format.url output
1913   new.block
1914   note output
1915   fin.entry
1916 }
1917
1918 FUNCTION {book}
1919 { output.bibitem
1920   author empty$
1921     { format.editors "author and editor" output.check
1922       editor format.key output
1923     }
1924     { format.authors output.nonnull
1925       crossref missing$
1926         { "author and editor" editor either.or.check }
1927       'skip$
1928     if$
1929   }
1930   if$
1931   new.block
1932   format.btitle "title" output.check
1933   crossref missing$
1934     { format.bvolume output
1935       new.block
1936       format.number.series output
1937       new.sentence
1938       publisher "publisher" output.check
1939       address output
1940     }
1941     { new.block
1942       format.book.crossref output.nonnull
1943     }
1944   if$
1945   format.edition output
1946   format.date "year" output.check

```

```

1947 format.isbn output
1948 format.url output
1949 new.block
1950 note output
1951 fin.entry
1952 }
1953
1954 FUNCTION {booklet}
1955 { output.bibitem
1956   format.authors output
1957   author format.key output
1958   new.block
1959   format.title "title" output.check
1960   howpublished address new.block.checkb
1961   howpublished output
1962   address output
1963   format.date output
1964   format.isbn output
1965   format.url output
1966   new.block
1967   note output
1968   fin.entry
1969 }
1970
1971 FUNCTION {inbook}
1972 { output.bibitem
1973   author empty$
1974   { format.editors "author and editor" output.check
1975     editor format.key output
1976   }
1977   { format.authors output.nonnull
1978     crossref missing$
1979     { "author and editor" editor either.or.check }
1980     'skip$
1981     if$
1982   }
1983   if$
1984   new.block
1985   format.btitle "title" output.check
1986   crossref missing$
1987   { format.bvolume output
1988     format.chapter.pages "chapter and pages" output.check
1989     new.block
1990     format.number.series output
1991     new.sentence
1992     publisher "publisher" output.check
1993     address output
1994   }
1995   { format.chapter.pages "chapter and pages" output.check
1996     new.block
1997     format.book.crossref output.nonnull
1998   }
1999   if$
2000   format.edition output

```

```

2001  format.date "year" output.check
2002  format.isbn output
2003  format.url output
2004  new.block
2005  note output
2006  fin.entry
2007 }
2008
2009 FUNCTION {incollection}
2010 { output.bibitem
2011   format.authors "author" output.check
2012   author format.key output
2013   new.block
2014   format.title "title" output.check
2015   new.block
2016   crossref missing$
2017     { format.in.ed.booktitle "booktitle" output.check
2018       format.bvolume output
2019       format.number.series output
2020       format.chapter.pages output
2021       new.sentence
2022       publisher "publisher" output.check
2023       address output
2024       format.edition output
2025       format.date "year" output.check
2026     }
2027     { format.incoll.inproc.crossref output.nonnull
2028       format.chapter.pages output
2029     }
2030   if$
2031   format.isbn output
2032   format.url output
2033   new.block
2034   note output
2035   fin.entry
2036 }
2037
2038 FUNCTION {inproceedings}
2039 { output.bibitem
2040   format.authors "author" output.check
2041   author format.key output
2042   new.block
2043   format.title "title" output.check
2044   new.block
2045   crossref missing$
2046     { format.in.ed.booktitle "booktitle" output.check
2047       format.bvolume output
2048       format.number.series output
2049       format.pages output
2050       address empty$
2051       { organization publisher new.sentence.checkb
2052         organization output
2053         publisher output
2054         format.date "year" output.check

```

```

2055     }
2056     { address output.nonnull
2057         format.date "year" output.check
2058         new.sentence
2059         organization output
2060         publisher output
2061     }
2062     if$
2063 }
2064 { format.incoll.inproc.crossref output.nonnull
2065     format.pages output
2066 }
2067 if$
2068 format.isbn output
2069 format.url output
2070 new.block
2071 note output
2072 fin.entry
2073 }
2074
2075 FUNCTION {conference} { inproceedings }
2076
2077 FUNCTION {manual}
2078 { output.bibitem
2079     format.authors output
2080     author format.key output
2081     new.block
2082     format.btitle "title" output.check
2083     organization address new.block.checkb
2084     organization output
2085     address output
2086     format.edition output
2087     format.date output
2088     format.url output
2089     new.block
2090     note output
2091     fin.entry
2092 }
2093
2094 FUNCTION {mastersthesis}
2095 { output.bibitem
2096     format.authors "author" output.check
2097     author format.key output
2098     new.block
2099     format.title "title" output.check
2100     new.block
2101     "Master's thesis" format.thesis.type output.nonnull
2102     school "school" output.check
2103     address output
2104     format.date "year" output.check
2105     format.url output
2106     new.block
2107     note output
2108     fin.entry

```

```

2109 }
2110
2111 FUNCTION {misc}
2112 { output.bibitem
2113   format.authors output
2114   author format.key output
2115   title howpublished new.block.checkb
2116   format.title output
2117   howpublished new.block.checka
2118   howpublished output
2119   format.date output
2120   format.issn output
2121   format.url output
2122   new.block
2123   note output
2124   fin.entry
2125   empty.misc.check
2126 }
2127
2128 FUNCTION {phdthesis}
2129 { output.bibitem
2130   format.authors "author" output.check
2131   author format.key output
2132   new.block
2133   format.btitle "title" output.check
2134   new.block
2135   "PhD thesis" format.thesis.type output.nonnull
2136   school "school" output.check
2137   address output
2138   format.date "year" output.check
2139   format.url output
2140   new.block
2141   note output
2142   fin.entry
2143 }
2144
2145 FUNCTION {proceedings}
2146 { output.bibitem
2147   format.editors output
2148   editor format.key output
2149   new.block
2150   format.btitle "title" output.check
2151   format.bvolume output
2152   format.number.series output
2153   address output
2154   format.date "year" output.check
2155   new.sentence
2156   organization output
2157   publisher output
2158   format.isbn output
2159   format.url output
2160   new.block
2161   note output
2162   fin.entry

```

```

2163 }
2164
2165 FUNCTION {techreport}
2166 { output.bibitem
2167   format.authors "author" output.check
2168   author format.key output
2169   new.block
2170   format.title "title" output.check
2171   new.block
2172   format.tr.number output.nonnull
2173   institution "institution" output.check
2174   address output
2175   format.date "year" output.check
2176   format.url output
2177   new.block
2178   note output
2179   fin.entry
2180 }
2181
2182 FUNCTION {unpublished}
2183 { output.bibitem
2184   format.authors "author" output.check
2185   author format.key output
2186   new.block
2187   format.title "title" output.check
2188   format.url output
2189   new.block
2190   note "note" output.check
2191   format.date output
2192   fin.entry
2193 }
2194
2195 FUNCTION {default.type} { misc }
2196
2197
2198 MACRO {jan} {"January"}
2199
2200 MACRO {feb} {"February"}
2201
2202 MACRO {mar} {"March"}
2203
2204 MACRO {apr} {"April"}
2205
2206 MACRO {may} {"May"}
2207
2208 MACRO {jun} {"June"}
2209
2210 MACRO {jul} {"July"}
2211
2212 MACRO {aug} {"August"}
2213
2214 MACRO {sep} {"September"}
2215
2216 MACRO {oct} {"October"}

```

```

2217
2218 MACRO {nov} {"November"}
2219
2220 MACRO {dec} {"December"}
2221
2222
2223
2224 MACRO {acmcs} {"ACM Computing Surveys"}
2225
2226 MACRO {acta} {"Acta Informatica"}
2227
2228 MACRO {cacm} {"Communications of the ACM"}
2229
2230 MACRO {ibmjrd} {"IBM Journal of Research and Development"}
2231
2232 MACRO {ibmsj} {"IBM Systems Journal"}
2233
2234 MACRO {ieeese} {"IEEE Transactions on Software Engineering"}
2235
2236 MACRO {ieeetc} {"IEEE Transactions on Computers"}
2237
2238 MACRO {ieeetcad}
2239 {"IEEE Transactions on Computer-Aided Design of Integrated Circuits"}
2240
2241 MACRO {ipl} {"Information Processing Letters"}
2242
2243 MACRO {jacm} {"Journal of the ACM"}
2244
2245 MACRO {jcss} {"Journal of Computer and System Sciences"}
2246
2247 MACRO {scp} {"Science of Computer Programming"}
2248
2249 MACRO {sicomp} {"SIAM Journal on Computing"}
2250
2251 MACRO {tocs} {"ACM Transactions on Computer Systems"}
2252
2253 MACRO {tods} {"ACM Transactions on Database Systems"}
2254
2255 MACRO {tog} {"ACM Transactions on Graphics"}
2256
2257 MACRO {toms} {"ACM Transactions on Mathematical Software"}
2258
2259 MACRO {toois} {"ACM Transactions on Office Information Systems"}
2260
2261 MACRO {toplas} {"ACM Transactions on Programming Languages and Systems"}
2262
2263 MACRO {tcs} {"Theoretical Computer Science"}
2264
2265
2266 READ
2267
2268 FUNCTION {sortify}
2269 { purify$
2270   "1" change.case$

```



```

2271 }
2272
2273 INTEGERS { len }
2274
2275 FUNCTION {chop.word}
2276 { 's :=
2277   'len :=
2278   s #1 len substring$ =
2279     { s len #1 + global.max$ substring$ }
2280     's
2281   if$
2282 }
2283
2284 FUNCTION {format.lab.names}
2285 { 's :=
2286   s #1 "{vv~}{ll}" format.name$
2287   s num.names$ duplicate$
2288   #2 >
2289     { pop$ " et~al." * }
2290     { #2 <
2291       'skip$
2292       { s #2 "{ff }{vv }{ll}{ jj}" format.name$ "others" =
2293         { " et~al." * }
2294         { " and " * s #2 "{vv~}{ll}" format.name$ * }
2295       if$
2296     }
2297     if$
2298   }
2299   if$
2300 }
2301
2302 FUNCTION {author.key.label}
2303 { author empty$
2304   { key empty$
2305     { cite$ #1 #3 substring$ }
2306     'key
2307   if$
2308   }
2309   { author format.lab.names }
2310   if$
2311 }
2312
2313 FUNCTION {author.editor.key.label}
2314 { author empty$
2315   { editor empty$
2316     { key empty$
2317       { cite$ #1 #3 substring$ }
2318       'key
2319     if$
2320     }
2321     { editor format.lab.names }
2322     if$
2323   }
2324   { author format.lab.names }

```

```

2325 if$
2326 }
2327
2328 FUNCTION {author.key.organization.label}
2329 { author empty$
2330   { key empty$
2331     { organization empty$
2332       { cite$ #1 #3 substring$ }
2333       { "The " #4 organization chop.word #3 text.prefix$ }
2334       if$
2335     }
2336     'key
2337     if$
2338   }
2339   { author format.lab.names }
2340   if$
2341 }
2342
2343 FUNCTION {editor.key.organization.label}
2344 { editor empty$
2345   { key empty$
2346     { organization empty$
2347       { cite$ #1 #3 substring$ }
2348       { "The " #4 organization chop.word #3 text.prefix$ }
2349       if$
2350     }
2351     'key
2352     if$
2353   }
2354   { editor format.lab.names }
2355   if$
2356 }
2357
2358 FUNCTION {calc.short.authors}
2359 { type$ "book" =
2360   type$ "inbook" =
2361   or
2362   'author.editor.key.label
2363   { type$ "proceedings" =
2364     'editor.key.organization.label
2365     { type$ "manual" =
2366       'author.key.organization.label
2367       'author.key.label
2368       if$
2369     }
2370     if$
2371   }
2372   if$
2373   'short.list :=
2374 }
2375
2376 FUNCTION {calc.label}
2377 { calc.short.authors
2378   short.list

```

```

2379 "("
2380 *
2381 year duplicate$ empty$
2382 short.list key field.or.null = or
2383 { pop$ "" }
2384 'skip$
2385 if$
2386 *
2387 'label :=
2388 }
2389
2390 FUNCTION {sort.format.names}
2391 { 's :=
2392   #1 'nameptr :=
2393   ""
2394   s num.names$ 'numnames :=
2395   numnames 'namesleft :=
2396   { namesleft #0 > }
2397   { nameptr #1 >
2398     { " " * }
2399     'skip$
2400     if$
2401     s nameptr "{vv{ } }{ll{ }}{ ff{ }}{ jj{ }}" format.name$ 't :=
2402     nameptr numnames = t "others" = and
2403     { "et al" * }
2404     { t sortify * }
2405     if$
2406     nameptr #1 + 'nameptr :=
2407     namesleft #1 - 'namesleft :=
2408   }
2409   while$
2410 }
2411
2412 FUNCTION {sort.format.title}
2413 { 't :=
2414   "A " #2
2415   "An " #3
2416   "The " #4 t chop.word
2417   chop.word
2418   chop.word
2419   sortify
2420   #1 global.max$ substring$
2421 }
2422
2423 FUNCTION {author.sort}
2424 { author empty$
2425   { key empty$
2426     { "to sort, need author or key in " cite$ * warning$
2427       ""
2428     }
2429     { key sortify }
2430   if$
2431 }
2432 { author sort.format.names }

```

```

2433 if$
2434 }
2435
2436 FUNCTION {author.editor.sort}
2437 { author empty$
2438   { editor empty$
2439     { key empty$
2440       { "to sort, need author, editor, or key in " cite$ * warning$
2441         ""
2442       }
2443       { key sortify }
2444       if$
2445     }
2446     { editor sort.format.names }
2447     if$
2448   }
2449   { author sort.format.names }
2450   if$
2451 }
2452
2453 FUNCTION {author.organization.sort}
2454 { author empty$
2455   { organization empty$
2456     { key empty$
2457       { "to sort, need author, organization, or key in " cite$ * warning$
2458         ""
2459       }
2460       { key sortify }
2461       if$
2462     }
2463     { "The " #4 organization chop.word sortify }
2464     if$
2465   }
2466   { author sort.format.names }
2467   if$
2468 }
2469
2470 FUNCTION {editor.organization.sort}
2471 { editor empty$
2472   { organization empty$
2473     { key empty$
2474       { "to sort, need editor, organization, or key in " cite$ * warning$
2475         ""
2476       }
2477       { key sortify }
2478       if$
2479     }
2480     { "The " #4 organization chop.word sortify }
2481     if$
2482   }
2483   { editor sort.format.names }
2484   if$
2485 }
2486

```

```

2487 FUNCTION {presort}
2488 { calc.label
2489   label sortify
2490   " "
2491   *
2492   type$ "book" =
2493   type$ "inbook" =
2494   or
2495     'author.editor.sort
2496     { type$ "proceedings" =
2497       'editor.organization.sort
2498       { type$ "manual" =
2499         'author.organization.sort
2500         'author.sort
2501         if$
2502       }
2503     } if$
2504   }
2505   if$
2506   " "
2507   *
2508   year field.or.null sortify
2509   *
2510   " "
2511   *
2512   title field.or.null
2513   sort.format.title
2514   *
2515   #1 entry.max$ substring$
2516   'sort.label :=
2517   sort.label *
2518   #1 entry.max$ substring$
2519   'sort.key$ :=
2520 }
2521
2522 ITERATE {presort}
2523
2524 SORT
2525
2526 STRINGS { longest.label last.label next.extra }
2527
2528 INTEGERS { longest.label.width last.extra.num number.label }
2529
2530 FUNCTION {initialize.longest.label}
2531 { "" 'longest.label :=
2532   #0 int.to.chr$ 'last.label :=
2533   "" 'next.extra :=
2534   #0 'longest.label.width :=
2535   #0 'last.extra.num :=
2536   #0 'number.label :=
2537 }
2538
2539 FUNCTION {forward.pass}
2540 { last.label label =

```

```

2541     { last.extra.num #1 + 'last.extra.num :=
2542       last.extra.num int.to.chr$ 'extra.label :=
2543     }
2544     { "a" chr.to.int$ 'last.extra.num :=
2545       "" 'extra.label :=
2546       label 'last.label :=
2547     }
2548   if$
2549   number.label #1 + 'number.label :=
2550 }
2551
2552 FUNCTION {reverse.pass}
2553 { next.extra "b" =
2554   { "a" 'extra.label := }
2555   'skip$
2556   if$
2557   extra.label 'next.extra :=
2558   extra.label
2559   duplicate$ empty$
2560   'skip$
2561   { "{\natexlab{" swap$ * "}}" * }
2562   if$
2563   'extra.label :=
2564   label extra.label * 'label :=
2565 }
2566
2567 EXECUTE {initialize.longest.label}
2568
2569 ITERATE {forward.pass}
2570
2571 REVERSE {reverse.pass}
2572
2573 FUNCTION {bib.sort.order}
2574 { sort.label 'sort.key$ :=
2575 }
2576
2577 ITERATE {bib.sort.order}
2578
2579 SORT
2580
2581 FUNCTION {begin.bib}
2582 { preamble$ empty$
2583   'skip$
2584   { preamble$ write$ newline$ }
2585   if$
2586   "\begin{thebibliography}{ number.label int.to.str$ * "}" *
2587   write$ newline$
2588   "\expandafter\ifx\csname natexlab\endcsname\relax\def\natexlab#1{#1}\fi"
2589   write$ newline$
2590   "\expandafter\ifx\csname url\endcsname\relax" write$ newline$
2591   " \def\url#1{{\tt #1}}\fi" write$ newline$
2592 }
2593
2594 EXECUTE {begin.bib}

```

```
2595
2596 EXECUTE {init.state.consts}
2597
2598 ITERATE {call.type$}
2599
2600 FUNCTION {end.bib}
2601 { newline$
2602   "\end{thebibliography}" write$ newline$
2603 }
2604
2605 EXECUTE {end.bib}
2606 </bst>
```