# The mines-thesis class *

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January 12, 2020

**Abstract**

This package provides a class for graduate students at Colorado School of Mines to prepare their theses and dissertations.

# Contents

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*This document corresponds to mines-thesis v1.0, dated 2020/01/10.
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# 1 User's Guide

## 1.1 Installation

## 1.2 Invocation and Options

\documentclass   The mines-thesis class is invoked in the standard fashion.

$$\documentclass[\langle options\rangle]{mines-thesis}$$

There are several options corresponding to the type of the document and its general appearance. They are described below. Generally speaking, the options have `key=value` forms, for example,

$$\documentclass[10pt]{mines-thesis}$$

The default options are letterpaper,12pt. **TODO review? oneside? onecolumn,draft,openany**

## 1.3 Preprogrammed Formats

```
\title
\author
\year
\degree
\advisor
\coadvisor
\department
\departmenthead
```
abstract        The environment `abstract` must *precede* the `\makefrontmatter` command. Again, this is different from the standard LATEX. Putting `abstract` after `\makefrontmatter` will trigger an error.

> \begin{abstract}
> *Here goes the abstract...*
> \end{abstract}

\makefrontmatter   The front matter of a thesis includes:

1. Title page (Required)

2. Copyright page

3. Submittal page (Required)

4. Abstract (Required)

5. Table of Contents (Required)

6. Lists (Required if included in thesis)

   (a) List of Figures

(b) List of Tables

(c) List of Equations (optional)

(d) List of Plates

(e) List of Symbols

7. Acknowledgments

8. Dedication

Invoking

```
\makefrontmatter
```

will generate all components listed above. It can be commentted out until you need the front matter generated.

`\chapter`
`\section`
`\subsection`
`\subsubsection`
`\paragraph`
`landscape`     Try the `lscape` package: `lscape.sty` Produce landscape pages in a (mainly) portrait document. This modifies the margins and rotates the page contents but not the page number. Useful, for example, with large multipage tables, and is compatible with the packages longtable and supertabular. If you are using pdfLaTeX, you should use `pdflscape` instead. The pdflscape package adds PDF support to the landscape environment of package lscape, by setting the PDF/Rotate page attribute. Pages with this attribute will be displayed in landscape orientation by conforming PDF viewers:

```
begin{landscape}
```
*Here goes the figure or table...*
```
\end{landscape}
```

`\OnehalfSpacing`
`\DoubleSpacing`
`SingleSpace`     `\OnehalfSpacing \OnehalfSpacing* \DoubleSpacing \DoubleSpacing*` Text will be double spaced or 1.5 spaced. Sometimes it is also required to make page notes and floats (including captions) in 'double' spacing. The starred version of the two macros above takes care of this.

# 2   Frequently Asked Questions

Blank pages. If you use `landscape` and got extra blank pages, it if mostly because your figure is too large. You need to resize the height or width of the figure. For example, instead of `\includegraphics[width=\linewidth]{FigureName}`, you should use `\includegraphics[width=.6\linewidth]{FigureName}`

When using line breaks in thesis title, chapter title, or section titles, use `\protect\\` instead of `\\`. This is because these titles use both `center` environment and `\MakeTextUppercase`. `\MakeLowercase` are robust but they have moving arguments (see `\protect`).

# 3   Implementation

## 3.1   Initial Code

These packages are useful when writing this `.dtx` file. The `\ifthenelse` macro controls many conditional logic command, So we load `ifthen` package. The `\collect@body` macro in `amsmath` is defined using `\def`. We load `environ` to access the `\long` version of this command.

```
1 \RequirePackage{ifthen}
2 \RequirePackage{environ}
```

### 3.1.1   Declaration of Options

The `review` boolean is defined here for use with the class options.

```
 3 \newboolean{review}
 4 \DeclareOption{draft}{\setboolean{review}{true}}
 5 \DeclareOption{final}{\setboolean{review}{false}
 6 \PassOptionsToClass{final,12pt,onecolumn,openany}{memoir}}
 7 \DeclareOption*{
 8 \PassOptionsToClass{\CurrentOption}{memoir}
 9 }
10 \ExecuteOptions{final}
```

### 3.1.2   Execution of Options

```
11 \ProcessOptions\relax
```

### 3.1.3   Package Loading

```
12 \LoadClass[oneside,letterpaper]{memoir}
```

## 3.2   Main Code

### 3.2.1   Global Setting

In this section, we define margins, spacings, indentations, hyphenations, and so on. The page is set by `\setpagecc` to be centered with respect to the stock.

```
13 \setpagecc{11in}{8.5in}{*}
```

The margins is set to be `1in` for all left, right, upper, and lower margins.

```
14 \setlrmarginsandblock{1in}{*}{*}
15 \setulmarginsandblock{1in}{*}{*}
```

If there is a header, its height would be `\onelineskip`. If there is a footer, it would be `2\onelineskip` below the body text. The header would be `2\onelineskip` above the body text.

```
16 \setheadfoot{\onelineskip}{2\onelineskip}
17 \setheaderspaces{*}{2\onelineskip}{*}
```

By default, we use double spacing for the thesis/dissertaion.

```
18 \DoubleSpacing
```

The paragraph indentation is `2em`. `1em` is roughly the width of a capital "M" in the current font. We will also indent the first paragraph after a section heading.

```
19 \setlength{\parindent}{2em}
20 \let\@afterindentfalse\@afterindenttrue
21 \@afterindenttrue
```

We check and implement the layout settings.

```
22 \checkandfixthelayout
```

Moreover, we remove all interior spaces for list enviroments,

```
23 \tightlists % use \firmlists if vertical gaps is wanted
```

and prevent LaTeX from hyphenating the entire document.

```
24 \tolerance=1
25 \emergencystretch=\maxdimen
26 \hyphenpenalty=10000
27 \hbadness=10000
```

### 3.2.2 Front Matter

\makefrontmatter   The `\makefrontmatter` will generate all front matter pages: `\maketitlepage` for Title Page, `\makecopyrightpage` for Copyright Page, `\makesubmittalpage` for Submittal Page, `\makeabstractpage` for Abstract, `\makecft` for Tables of Contents (toc) and Lists (List of Figures (lof) & List of Tables (lot)), `\makeacknowledgepage` for Acknowledgments, and `\makededicationpage` for Dedication.

First We define the macros for the informations and set their default values.

\title
\author
\year
\degree
\advisor
\coadvisor
\department
\departmenthead

```
28 \renewcommand{\year}[1]{\gdef\@year{#1}}
29 \newcommand{\degree}[2]{\gdef\@degreelv{#1}\gdef\@degreename{#2}}
30 \newcommand{\advisor}[1]{\gdef\@advisor{#1}}
31 \newcommand{\coadvisor}[1]{\gdef\@coadvisor{#1}}
32 \newcommand{\department}[1]{\gdef\@department{#1}}
33 \newcommand{\departmenthead}[1]{\gdef\@departmenthead{#1}}
34 \gdef\@author{Student Name}
35 \gdef\@title{This is the first line of a  medium length title,
```

```
36 \protect\\ this is the second line}
37 \gdef\@year{2020}
38 \gdef\@degreelv{Doctor of Philosophy}
39 \gdef\@degreename{Computer Science}
40 \gdef\@advisor{Dr. Main Advisor}
41 \gdef\@department{Department of XXXXX}
42 \gdef\@departmenthead{Dr. Department Head}
```

\maketitlepage     The thesis title must be in all upper case letters, be centered on the page both horizontally and vertically, be in an inverted pyramid shape and the font size needs to be the same size as all other font in the main text (i.e. do not make the font size larger).

```
43 \newboolean{auto} % for auto pyramid
44 \setboolean{auto}{false}

45 \DeclareRobustCommand{\invpyr}[1]{
46 \vbox{
47 \vspace{10pt}
48 \hsize=\textwidth
49 \parindent=\z@
50 \emergencystretch=1in
51 \parshape 6
52 0.01\textwidth .98\textwidth
53 0.1\textwidth .8\textwidth
54 0.15\textwidth .7\textwidth
55 0.2\textwidth .6\textwidth
56 0.25\textwidth .5\textwidth
57 0.3\textwidth .4\textwidth
58 \leftskip=\z@ plus 1fil
59 \rightskip=\z@ plus -1fil
60 \parfillskip=\z@ plus 2fil
61 #1\par
62 }
63 }
64 \newcommand{\autotitle}{\setboolean{auto}{true}}
65 \newcommand{\maketitlepage}{
66 \clearpage
67 \begin{vplace}
68 \centering
69 \ifthenelse{\boolean{auto}}
70 {\invpyr{\MakeTextUppercase{\@title}}}
71 {\@title}
72 \end{vplace}
73 \begin{center}
74 by\\
75 \@author
76 \end{center}
77 \clearpage
78 } % end of \maketitlepage
```

**\makecopyrightpage**    Copyright Page. This is an optional page that follows the title page. No displayed page number, centered upper and lower case text.

```
79 \newcommand{\makecopyrightpage}{
80 \clearpage
81 \begin{vplace}[0.8]
82 \centering
83 Copyright~by~\@author~\@year\\
84 All~Rights~Reserved
85 \end{vplace}
86 \clearpage
87 } % end of \makecopyrightpage
```

**\makesubmittalpage**    Submittal Page. This is a required page that displays the Roman numeral ii page number. Beginning with this page, front matter Roman numeral page numbers are centered 1/2 inch from the bottom edge of page. All signatures are required before the final thesis format review.

```
88 \newcommand{\makesubmittalpage}{
89 \clearpage
90 A thesis submitted to the Faculty and the Board of
91 Trustees of the Colorado School of Mines in partial
92 fulfillment of the requirements for the degree of
93 {\@degreelv} ({\@degreename}).
94 \vspace{2em}
95 \begin{flushleft}
96 Golden, Colorado\\[.5em]
97 Date \underline{\hspace{2in}}
98 \end{flushleft}
99 \vspace{.5em}
100 \begin{flushright}
101 Signed: \underline{\hspace{2in}}\\
102 {\@author}\\[2em]
103 Signed: \underline{\hspace{2in}}\\
104 \begin{SingleSpace}
105 {\@advisor}\\
106 Thesis Advisor\\[2em]
107 \end{SingleSpace}
108 \@ifundefined{@coadvisor}{
109 \vspace{2.5em}
110 }{
111 Signed: \underline{\hspace{2in}}\\
112 \begin{SingleSpace}
113 {\@coadvisor}\\
114 Thesis Advisor
115 \end{SingleSpace}
116 }
117 \end{flushright}
118 \begin{flushleft}
119 Golden, Colorado\\[.5em]
120 Date \underline{\hspace{2in}}
```

```
121 \end{flushleft}
122 \vspace{.5em}
123 \begin{flushright}
124 Signed: \underline{\hspace{2in}}\\
125 \begin{SingleSpace}
126 {\@departmenthead}\\
127 Professor and Head\\
128 {\@department}
129 \end{SingleSpace}
130 \end{flushright}
131 \clearpage
132 } % end of \makesubmittalpage
```

\makeabstractpage    ABSTRACT (title) is centered horizontally, 1 keyboard return below 1 inch top margin and in ALL UPPER CASE LETTERS. Each paragraph should be indented.

abstract    We redifine the `abstract` environment to save the text.

\@saveabstract

```
133 \newcommand{\@saveabstract}[1]{\long\gdef\@abstract{#1}}
```

```
134 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
```

Abstract will show in the table of contents.
```
135 \newcommand{\makeabstractpage}{
136 \clearpage
137 \chapter*{Abstract}
138 \@abstract
139 \addcontentsline{toc}{chapter}{\abstractname}
140 \clearpage
141 } % end of \makeabstractpage
```

\makeacknowledgepage    ACKNOWLEDGMENTS (Title) is centered horizontally, 1 keyboard return below 1 inch top margin and in ALL UPPER CASE LETTERS.

acknowledgment    We difine the `acknowledgment` environment. First, we need to save the text.

\@saveacknowledgments

```
142 \newcommand{\@saveacknowledgments}[1]{
143 \long\gdef\@acknowledgments{#1}}
```

```
144 \newenvironment{acknowledgment}{\Collect@Body\@saveacknowledgments}{}
```

Acknowledgment page is not required.
```
145 \newcommand{\makeacknowledgepage}{
146 \@ifundefined{@acknowledgments}{}{
147 \clearpage
148 \chapter*{Acknowledgments}
149 \@acknowledgments
150 \addcontentsline{toc}{chapter}{ACKNOWLEDGMENTS}
151 \clearpage}
152 } % end of \makeacknowledgepage
```

**dedication**   We difine the `dedication` environment. First, we need to save the text

153 `\newenvironment{dedication}{\Collect@Body\@savededication}{}`

**\@savededication**   And saving the dedication

154 `\newcommand{\@savededication}[1]{`
155 `\long\gdef\@dedication{#1}`
156 `}`

**\makededicationpage**   ACKNOWLEDGMENTS (Title) is centered horizontally, 1 keyboard return below 1 inch top margin and in ALL UPPER CASE LETTERS. Dedication Page: A dedication page is optional and not frequently included in a thesis. However, occasionally the thesis writer wants to dedicate the document to a professional colleague, friend, or relative. A dedication typically expresses gratitude for someone's support. If a dedication page is included, it is placed at the end of the front matter section, following the acknowledgments. Typically, a dedication page has no title, it simply states, e.g., "For my father." Roman numeral page numbering continues on the dedication page.

157 `\newcommand{\makededicationpage}{`
158 `\@ifundefined{@dedication}{}{`
159 `\clearpage`
160 `\@dedication`
161 `\clearpage`
162 `}`
163 `}`

**\l@chapapp**   Redefine the generic chapter/appendix ToC entry typesetting.

164 `\renewcommand{\l@chapapp}[3]{%`
165 `\ifnum \c@tocdepth >\m@ne`
166 `\begin{SingleSpace}`
167 `\cftchapterbreak`
168 `\vskip \cftbeforechapterskip`
169 `{`
170 `\leftskip \cftchapterindent\relax`
171 `%%%      \memRTLleftskip \cftchapterindent\relax`
172 `\rightskip \@tocrmarg`
173 `%%%      \memRTLrightskip \@tocrmarg`
174 `\parfillskip -\rightskip`
175 `%%%      \parfillskip -\memRTLrightskip`
176 `\parindent \cftchapterindent\relax`
177 `\@afterindenttrue`
178 `\interlinepenalty\@M`
179 `\leavevmode`
180 `\let\@cftbsnum \cftchapterpresnum`
181 `\let\@cftasnum \cftchapteraftersnum`
182 `\let\@cftasnumb \cftchapteraftersnumb`
183 `\def\@chapapp@head{#3}%`
184 `\settowidth{\@tempdima}{\cftchapterfont\@chapapp@head}%`
185 `\addtolength{\@tempdima}{\cftchapternumwidth}%`

```
186 \advance\leftskip \@tempdima \null\nobreak\hskip -\leftskip
187 %%%     \advance\memRTLleftskip \@tempdima \null\nobreak\hskip -\memRTLleftskip
188 {\cftchapterfont {#1}}\nobreak
189 \cftchapterfillnum{#2}}
190 \end{SingleSpace}
191 \fi}

192 \renewcommand{\cftchapterdotsep}{\cftdotsep}
193 \renewcommand{\cftchapterfont}{\normalfont\MakeTextUppercase}
194 \renewcommand{\cftchapterpagefont}{\normalfont}
195 \renewcommand{\cftchapterleader}{\cftdotfill{\cftchapterdotsep}}
196 \renewcommand{\cftchaptername}{\chaptername\space}
197 \renewcommand{\cftappendixname}{\appendixname\space}
198 \renewcommand{\cftdotsep}{1}
199 % ^^A no extra space before the entry, or in the LoF/LoT
200 \setlength{\cftbeforechapterskip}{\z@ plus \z@}
201 \renewcommand{\insertchapterspace}{}
202 % ^^A \renewcommand{\insertchapterspace}{
203 % ^^A  \addtocontents{lof}{\protect\addvspace{5pt}} % previous default 10pt
204 % ^^A   \addtocontents{lot}{\protect\addvspace{5pt}}
205 % ^^A }
```

\makecft  \makecft generates Table of Contents, List of Figures, and List of Tables. TABLE
OF CONTENTS (Title) is centered horizontally, 1 keyboard return below 1 inch
top margin and in ALL UPPER CASE LETTERS

```
206 \AtBeginDocument{
207 \@ifpackageloaded{hyperref}{
208 \settocpreprocessor{chapter}{%
209 \let\tempf@rtoc\f@rtoc%
210 \def\f@rtoc{%When hyperref is used,
211 \texorpdfstring{\MakeTextUppercase{\tempf@rtoc}}{\tempf@rtoc}}%
212 }
213 \renewcommand{\cftchapterfont}{\normalfont}
214 }{}
215 }
216 \newcommand{\makecft}{
217 \tableofcontents*
218 \clearpage
219 \listoffigures
220 \clearpage
221 \listoftables
222 \clearpage
223 } % end \makecft
```

We rename the headings for the toc, lof, lot, and the references.

```
224 \renewcommand{\abstractname}{ABSTRACT}
225 \renewcommand{\chaptername}{CHAPTER}
226 \renewcommand{\appendixname}{APPENDIX}
227 \renewcommand{\contentsname}{TABLE OF CONTENTS}
```

```
228 \renewcommand{\listfigurename}{LIST OF FIGURES}
229 \renewcommand{\listtablename}{LIST OF TABLES}
230 %% for REFERENCE section
231 \renewcommand{\bibname}{REFERENCES}
```

\@dottedtocline@sec    Redifine \@dottedtocline from the original ltsect.dtx \@dottedtocline{⟨level⟩}{⟨indent⟩}{⟨numwidth⟩

```
232 \newcommand{\@dottedtocline@sec}[5]{%
233 \ifnum #1>\c@tocdepth \else
234 \begin{SingleSpace}
235 \vskip \z@ \@plus.2\p@
236 {\leftskip #2\relax \rightskip \@tocrmarg \parfillskip -\rightskip
237 \parindent #2\relax\@afterindenttrue
238 \interlinepenalty\@M
239 \leavevmode
240 \@tempdima #3\relax
241 \advance\leftskip \@tempdima \null\nobreak\hskip -\leftskip
242 {#4}\nobreak
243 \leaders\hbox{$\m@th
244 \mkern \@dotsep mu\hbox{.}\mkern \@dotsep
245 mu$}\hfill
246 \nobreak
247 \hb@xt@\@pnumwidth{\hfil\normalfont \normalcolor #5}%
248 \par}
249 \end{SingleSpace}%
250 \fi}
```

\l@section    \l@section{⟨title⟩}{⟨page⟩} typesets the ToC entry for a \section heading.

```
251 \renewcommand{\@dotsep}{1}
252 \renewcommand{\l@section}{
253 \@dottedtocline@sec{1}{1.5em}{2.3em}
254 }

255 \renewcommand{\cftfigurename}{\figurename\space}
256 \renewcommand{\cfttablename}{\tablename\space}
```

\l@figure    \l@figure{⟨title⟩}{⟨page⟩} typesets the LoF entry for a \figure caption heading.
Multiple line figure captions are single spaced.

```
257 \let\oldl@figure=\l@figure
258 \renewcommand{\l@figure}{\SingleSpacing\oldl@figure}
```

\l@table    \l@table{⟨title⟩}{⟨page⟩} typesets the LoF entry for a \table caption heading.
Multiple line table captions are single spaced.

```
259 \let\oldl@table=\l@table
260 \renewcommand{\l@table}{\SingleSpacing\oldl@table}

261 \newcommand{\makefrontmatter}{
262 \pagenumbering{roman}
263 \pagestyle{empty}
264 \maketitlepage
265 \makecopyrightpage
```

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```
266 \pagestyle{plain}
267 \setcounter{page}{2}
268 \makesubmittalpage
269 \makeabstractpage
270 \makecft
271 \makeacknowledgepage
272 \makededicationpage
273 \pagenumbering{arabic}
274 \setcounter{page}{1}
275 } % end of \makefrontmatter
```

### 3.2.3 Main Body

\chapter

```
276 \makechapterstyle{mineschapter}{%
277 \setlength{\midchapskip}{.2\baselineskip}
278 \setlength{\afterchapskip}{.2\baselineskip}
279 \renewcommand{\chapnumfont}{\normalfont}
280 \renewcommand{\chaptitlefont}{\normalfont}
281 \renewcommand{\chapterheadstart}{}
282 \renewcommand{\printchapternum}{}
283 \renewcommand{\printchapternonum}{}
284 \renewcommand{\printchaptername}{%
285 \centerline{\chapnumfont\MakeTextUppercase{\@chapapp\ \thechapter}}}
286 \renewcommand{\printchaptertitle}[1]{%
287 \centering \vbox{\chaptitlefont\invpyr{\MakeTextUppercase{##1}}}
288 }
289 }
290 \chapterstyle{mineschapter}
```

\reproduceinfo  Information about the reproduced chapter. Including the author, year, organization, publisher.

```
291 \newcommand{\reproduceinfo}[1]{
292 \begin{center}
293 #1\par
294 \end{center}
295 }
```

\reproduceabstract  One single line of Abstract flused left.

```
296 \newcommand{\reproduceabstract}{
297 {\noindent Abstract\par}
298 }
```

\footnote  Set the format for \footnote. One horizontal line to separate the text and the footnotes.

```
299 \AtBeginDocument{
300 \setlength{\footmarkwidth}{\z@}
301 \setlength{\footmarksep}{-\footmarkwidth}
302 \setlength{\footparindent}{\footmarkwidth}
```

```
303 \renewcommand{\footnoterule}{%
304 \kern .5\baselineskip%
305 \hrule width \columnwidth \kern .5\baselineskip}
306 }
```

\symbolfootnote  A new type of footnote command which use symbols instead of arabic numbers as markers

```
307 \newcommand{\symbolfootnote}[2]{
308 \renewcommand{\thefootnote}{\fnsymbol{footnote}}
309 \footnote[#1]{#2}
310 \renewcommand{\thefootnote}{\arabic{footnote}}
311 }
```

\section  Redefine \section, \subsection and \subsubsection.

```
312 \renewcommand{\section}{\@startsection{section}
313 {1} % level
314 {\z@} % indent from left margin
315 {.1ex} % skip above heading
316 {.1ex} % heading between title and text
317 {\normalfont\normalsize\bfseries}}
318 \renewcommand{\subsection}{\@startsection{subsection}
319 {1} % level
320 {\z@} % indent from left margin
321 {.1ex} % skip above heading
322 {.1ex} % heading between title and text
323 {\normalfont\normalsize\bfseries}}
324 \renewcommand{\subsubsection}{\@startsection{subsubsection}
325 {1} % level
326 {\z@} % indent from left margin
327 {.1ex} % skip above heading
328 {.1ex} % heading between title and text
329 {\normalfont\normalsize\bfseries}}
```

longtable

```
330 \AtBeginDocument{
331 \@ifpackageloaded{longtable}{
332 \setlength{\LTcapwidth}{\linewidth}
333
334 }{}
335 }
```

### 3.2.4  Back Matter

Change the indent of References if `natbib` package is loaded.

```
336 \AtBeginDocument{
337 \@ifpackageloaded{natbib}{
338 \setlength{\bibhang}{\parindent}
339 \renewcommand{\bibpreamble}{\vspace{\parskip}}
340 }{}
341 }
```

\bibliography

```
342 \let\oldbibliography=\bibliography
343 \renewcommand{\bibliography}[1]{
344 \begin{SingleSpace}
345 \oldbibliography{#1}
346 \end{SingleSpace}
347 }
```

### 3.2.5   Others

landscape   We define the landscape to handle the page numbering in landscape mode.

```
348 \AtBeginDocument{
349 \@ifpackageloaded{pdflscape}{
350 \newcommand{\Lpagenumber}{\ifdim\textwidth=\linewidth\else\bgroup
351 \dimendef\margin=0 %use \margin instead of \dimen0
352 \ifodd\value{page}\margin=\oddsidemargin
353 \else\margin=\evensidemargin
354 \fi
355 \raisebox{\dimexpr -\topmargin-\headheight-\headsep-0.5\linewidth}[0pt][0pt]{%
356 \rlap{\hspace{\dimexpr \margin+\textheight+\footskip}%
357 \llap{\rotatebox{90}{\thepage}}}}%
358 \egroup\fi
359 }
360 \@ifpackageloaded{everypage}{
361 \AddEverypageHook{\Lpagenumber}%
362 \let\oldlandscape=\landscape
363 \let\endoldlandscape=\endlandscape
364 \renewenvironment{landscape}{
365 \oldlandscape\pagestyle{empty}\begin{vplace}}{
366 \end{vplace}\endoldlandscape
367 \pagestyle{plain}}
368 }{}
369 }{}
370 }
```