

L^AT_EX Class for The *Annals of Mathematics**

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2025/01/20, v1.32

Abstract

This package provides a class for typesetting articles for The *Annals of Mathematics*

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1 Introduction

The *Annals of Mathematics* is published bimonthly with the cooperation of Princeton University and the Institute for Advanced Study. Founded in 1884 by Ormond Stone of the University of Virginia, the journal was transferred in 1899 to Harvard University, and in 1911 to Princeton University. Since 1933, the Annals has been edited jointly by Princeton University and the Institute for Advanced Study (see <http://annals.princeton.edu/annals/about/journal/about.html>).

This class presents a complete redesign of the journal style—with new fonts and new interface.

An author well acquainted with AMS \LaTeX should find this package easy to use and configurable. The User Manual below illustrates the basic use of the class and discusses the differences with `amsart`. For an in-depth tutorial of AMS \LaTeX I could recommend the excellent book [1].

2 User's Guide

2.1 Installation

The installation of the class follows the usual practice [2] for \LaTeX packages:

1. Run `latex` on `aomart.ins`. This will produce the file `aomart.cls`.
2. Put the file `aomart.cls` to the place where \LaTeX can find them (see [2] or the documentation for your \TeX system).
3. Update the database of file names. Again, see [2] or the documentation for your \TeX system for the system-specific details.
4. The file `aomart.pdf` provides the documentation for the package (this is the file you are probably reading now).

As an alternative to items 2 and 3 you can just put the files in the working directory where your `.tex` file is.

The class uses some other \LaTeX classes or packages. Most probably, they are already installed on your system. If not (or if their versions are very old), you need to download and install them. Here is the list:

1. `amsart` class and related packages [3],
2. Package `hyperref` [4],
3. `ifpdf` package [5],
4. `fancyhdr` package [6],
5. `cmtiup` package [7] for “special italics” with upright digits and punctuation. Note that since many distributions do not include this package, you may need to install it yourself. Just download the file <http://mirrors.ctan.org/fonts/cm/cmtiup.zip>, unzip it in your `TEXMF` directory and rebuild the file names database with the command like `mktexlsr`,
6. `yhmath` package [8].

2.2 Invocation

To use the class, put in the preamble of your document

```
\documentclass[options]{aomart}
```

The class internally loads `amsart`, so all facilities of `amsart` [1, 9] can be used in the source.

The class should work with the Babel [10] package. At present, English, French and German languages are fully supported. See also Section 2.9.

options The options `draft` and `final` work in the same way as for `amsart` and standard `draft` \LaTeX . If the option `draft` is chosen, the overfull lines are marked by black boxes on the margins *and* the `\includegraphics` prints blank placeholders for the images. The option `final` (default) switches off the marking of overfull lines and restores the behavior of `\includegraphics`. To switch on just the overfull marks, without changing the behavior of `\includegraphics`, one can either explicitly pass the option `final` to `graphics` package:

```
\documentclass[draft]{aomart}
\usepackage[final]{graphics}
```

or add in the beginning of the document

```
\overfullrule=5pt
```

option The option `manuscript` is intended to facilitate the communications between `manuscript` the editor and the author. It enables two things:

1. Numbering of lines in the manuscript is switched off in the normal mode, but is on in the manuscript mode.
2. Command `\EditorialComment` is no-op in normal mode, but produces marginal commentaries in the manuscript
3. Hyperlinks are black in normal mode, but blue in manuscript mode.

option The option `screen` is intended for the onscreen version of the article. If this `screen` option is selected, the links are blue colored, and the margins are reduced.

option Starting from version 1.9 (2011) the formatting of DOI numbers changed according to the new recommendations from CrossRef. The option `olddoi` switches on the “old” formatting. It is used for compatibility reasons.

option Starting from version 1.5 (2016) the formatting of DOI numbers changed again according to CrossRef recommendations. The option `doi2016` switches to the version existed between 2011 and 2016.

option Since June 2017 keywords and AMS Mathematical Subjects classification numbers are printed on the title page. The option `oldkeywords` suppresses this.

options The size-changing options of `amsart` class (`8pt`, `9pt`, \dots , `12pt`) have no effect other than producing a warning in the log since the journal is designed for only one type size (roughly corresponding to `11pt` of `amsart`).

`10pt` Normally the scheme for MSC numbers is not printed. If the option `printscheme` is chosen, however, it is printed explicitly.

`11pt`

`12pt`

option
`printscheme`

2.3 Top Matter

There are two kinds of top matter commands: the ones used primarily for authors and the ones used primarily for editors. We describe them separately.

The macros described below must be issued in the preamble of the document, i.e. before `\begin{document}`. They produce fatal error otherwise. This behavior is required by the way non- \TeX scripts process the files to produce metadata.

The only exception is `abstract`, which should be placed after `\begin{document}`.

2.3.1 Commands for Authors

`\title` The command `\title`, as in `amsart` class, has two arguments: one optional, and one mandatory:

```
\title[{ShortTitle}]{{FullTitle}}
```

The mandatory argument is the full title of the article. The optional argument, if present, defines the shorter version of the title for running heads. If the optional argument is absent, the full title is used instead.

The optional argument should be used in two cases: when the full title is too long to fit in the running head, *and* when the author wants to add a footnote or linebreaks to the title.

`\author` The interface for specifying the authors and their affiliations is close to the one of `amsart` [11] (and different from the standard \LaTeX). For each author a separate command `\author` should be used, followed by `\address` and (optionally) `\curraddr`, `\email`, `\urladdr` and `\orcid`. Note that the house style of the *Annals of Mathematics* requires writing `\address` in the form *Institution, City, State* (or *Institution, City, Country* for non-US locations). Like the newer versions of `amsart`, `aomart` does *not* require the doubling of the `@` symbols in the e-mail addresses. The macro `\author` has two arguments, similarly to `\title`:

```
\author[{AbbrevName}]{{FullName}}
```

The optional argument defines the shorter form of the author's name to be included in the running head.

`\givenname` The papers published in the *Annals of Mathematics* are included in various databases. For the indexing purposes it is important to correctly separate the authors' names into "First Name/Surname" parts. This operation is not easy for the computers. Therefore we decided that the authors should know best how to deal with their names. The macros `\givenname` and `\surname` are used to indicate how to split the name into the parts.

`\fulladdress` Another command which does not affect the typesetting is `\fulladdress`. It is used to store the full mailing address of the author for the online version of the journal and various databases.

`\contrib` Sometimes there are contributors to a paper, who are not full authors: the person may write an appendix or other part of the paper. You can use the command `\contrib[{role}]{{name}}` for indicating these persons. Note that [*role*] argument has a special meaning, indicating that the role of this person is the same as for the previous contributor, for example,

```
\contrib[with Appendix~A by]{A. U. Thor}  
\givenname{Alexandra}\surname{Thor}  
\contrib{A. N. Other}
```

```

\givenname{Antony N.}\surname{Other}
\contrib[with Appendix~B by]{Y. Etanother}
\givenname{Yakov}\surname{Etanother}

```

In this example Appendix A is written by A. U. Thor and A. N. Another, and Appendix B is written by Y. Etanother. Commands `\orcid`, `\email`, `\address`, `\fulladdress`, `\givenname` and `\surname` can be used for contributors in the same way they are used for authors.

`\shortauthors` In some cases the authors list may be too long for the running head, even if the abbreviated forms are used for each author. In this case it is possible to change the running head by a *redefinition* of the command `\shortauthors`. This redefinition must be done after all `\author` commands, but before `\maketitle`:

```

\renewcommand{\shortauthors}{A.~Smith et al}

```

`\thanks` Like `amsart` (and unlike standard L^AT_EX), `aomart` allows `\thanks` only *outside* of commands `\title` and `\author`.

`\copyrightnote` Normally each paper is copyrighted by Department of Mathematics, Princeton University. This is reflected in the footnote on the first page of the article. However, by arrangement with the editors, certain papers may have different copyright. The command `\copyrightnote{\copyright statement}`, if issued, changes the footnote to the corresponding text, for example:

```

\copyrightnote{\textcopyright~2012 by the authors. This paper may
be reproduced, in its entirety, for noncommercial purposes.}

```

Note that if you issue this command, you should explicitly include both the copyright sign and the year unless the paper does not have a copyright, for example:

```

\copyrightnote{This paper is in the public domain}

```

`abstract` (*env.*) The abstract of the paper must be put between `\begin{abstract}` and `\end{abstract}`. Unlike the situation in `amsart` class, `abstract` may be put *after* `\maketitle`.

A paper may have several abstracts in different languages. This situation is discussed in Section 2.9.

`\maketitle` The macro `\maketitle` typesets the top matter. All top matter information should be specified before this command.

2.3.2 Commands for Editors

The commands described in this section should be used by the editors to insert the information about the published paper. They must be put before the `\maketitle` command.

`\keyword` The command `\keyword` adds a keyword to the list of keywords. This command may be repeated, for example

```

\keyword{Embedding theorem}
\keyword{Relatively hyperbolic group}

```

`\subject` The command `\subject` has three parameters: whether the subject is primary or secondary, the classification scheme and the subject itself, for example

```

\subject{primary}{msc2000}{20E45}
\subject{secondary}{msc2000}{20F65}

```

`\formatdate` The macro `\formatdate` is used to format the dates in the commands. Its argument is the date in the format `YYYY-MM-DD`, for example

```

\formatdate{2010-08-13}

```

`\received` The commands `\received`, `\revised`, `\accepted`, `\published`, `\publishedonline` accept as a parameter a date in the form `\formatdate{(YYYY-MM-DD)}`, for example

```

\published
\publishedonline
\received{\formatdate{2004-12-24}}
\revised{\formatdate{2006-04-12}}
\accepted{\formatdate{2007-10-02}}

```

`\proposed` The macros `\proposed`, `\seconded`, `\corresponding`, `\editor`, `\version` are used to set the corresponding metadata for the editorial process, for example

```

\corresponding
\editor
\version
\proposed{E. D. Itor}
\seconded{A. S. Sociate}
\corresponding{A. U. Thor}
\version{2.1}

```

`\volumenumber` The macros `\volumenumber`, `\issuenumber`, `\publicationyear`, `\papernumber`, `\startpage`, `\endpage` set up the corresponding data for the paper, for example:

```

\publicationyear
\papernumber
\startpage
\endpage
\volumenumber{172}
\issuenumber{1}
\publicationyear{2010}
\papernumber{1}
\startpage{1}
\endpage{39}

```

Note that if the argument of `\endpage` is empty, L^AT_EX tries to calculate the last page number as best as it can.

`\copyrightyear` In the standard copyright statement the copyright year is assumed to be the same as the `\publicationyear`. However, for special cases one can set the copyright year explicitly, for example,

```

\publicationyear{2012}
\copyrightyear{2011}

```

Note that if you use your own copyright statement instead of the canned one (with the command `\copyrightnote`), you need to put there the copyright year explicitly instead of using this command.

`\doinumber` The macros `\doinumber`, `\mrnumber` and `\zblnumber` set the information

```

\mrnumber
\zblnumber
\arxivnumber

```

about paper in four major reference databases: DOI (<http://www.doi.org/>), MathSciNet (<http://www.ams.org/mathscinet/>), Zentralblatt MATH (<http://www.zentralblatt-math.org/zmath/>) and arXiv (<https://www.arxiv.org>). The use of these macros should be obvious:

```
\doinumber{10.1215/S0012-7094-92-06520-3}
\mrnumber{1154181}
\zblnumber{0774.14039}
\arxivnumber{1234.567890}
```

Note the difference between these commands and the bibliography commands discussed in Section 2.8. Commands in this Section set up the data for the *current article*. Commands in Section 2.8 set up the data for the articles in the bibliography list.

Normally you should *not* use `\doinumber` command, since the class will construct the standard DOI for the paper from the volume, issue and paper information. Use it *only* if the result is by any reason wrong.

`\oldsubsections` Starting with version 1.2 we decreased the vertical spacing before `\subsection`. The command `\oldsubsections` restores the “old” values.

The class has a system of editorial comments and highlighting for communication between copy editors, production editors, journal editors and authors. All these comments are visible only in the `manuscript` mode. In production environment they are not displayed.

The important feature of these commands is the notion of **audience**. Each comment or highlighting has an audience in mind, which is the optional argument of the comments and highlights. One can selectively enable the comments for the given audience. There is a special audience called `default`, which is enabled, well, by default. All other audiences must be enabled explicitly.

`\EditorialComment` The macro `\EditorialComment[audience]{comments}` typesets the comments on the margins in the `manuscript` mode for the selected audience, for example,

```
Erd"os proved the following theorem.\EditorialComment{A citation is
needed}
```

```
Erd"os proved the following
theorem~\cite{Erd01}.\EditorialComment[Editor]{Please check the
citation}
```

`\Highlight` The macro `\Highlight[audience]{text}` highlights the `text` for the selected **audience**. The highlighting is done using the color selected for the given audience, for example

```
This is described by the following
theorem\Highlight{:}\EditorialComment{Added ‘:’}
```

```
This is described by the following
theorem\Highlight[Editor]{:}\EditorialComment[Editor]{Do we need
‘:’ here?}
```


Code	Example
<code>\widetilde{AB}</code>	\widetilde{AB}
<code>\widehat{AB}</code>	\widehat{AB}
<code>\widetriangle{AB}</code>	\widetriangle{AB}
<code>\wideparen{AB}</code>	\wideparen{AB}
<code>\widering{AB}</code>	\widering{AB}
<code>\widebar{AB}</code>	\widebar{AB}

Table 1: Wide Mathematical Accents

`\ECSelect` The audiences to be displayed are selected by the command `\ECSelect{⟨audiences⟩}` with the comma separated list of audiences, for example,

```
\ECSelect{Editor,Author}
```

The audience “default” is selected by default.

`\HSelect` The command `\Hselect[⟨color⟩]{⟨audience⟩}` selects the audience for which the highlight is intended. The optional argument “color” is used for highlighting, for example,

```
\HSelect[green]{Editor}
```

The audience “default” is selected by default.

2.4 Additional Macros

`eqnarray` (*env.*) The class `aomart` loads the class `amsart`. Therefore all familiar `amsmath` commands [9] are available. In particular, there are many commands for writing multiline equations (`split`, `align`, `gather`, `multline`, ...). The environments `eqnarray` and `eqnarray*`, while still available, are *not* recommended and should be avoided if possible.

`\widetilde` A number of “wide” mathematical accents is available due to the (internally loaded) package `yhmath` [8]: `\widetilde`, `\widehat`, `\widetriangle`, `\wideparen`, `\widetriangle`, `\widering`, `\widebar`. See Table 1 for the example of the usage.

`\wideparen` A set of macros is used to make more convenient clickable references in the online versions of papers. The package `hyperref` [4] makes clickable reference numbers in the phrases like

```
\fullref      ...in theorem~\ref{thm:Noeter}...
\pfullref     ...see equation~\eqref{eq:alpha}...
\bfullref
\eqfullref
```

`\fullpageref` However, it is more convenient for the readers if both the number *and* the word “theorem” or “equation” were clickable. The macros `*fullref` solve this problem. Each macro has two arguments: the word and the reference, for example

```
...in \fullref{theorem}{thm:Noeter}...
```

The command `\pfullref` typesets the reference in parentheses. The command `\bfullref` typesets it in brackets, and the command `\eqfullref` uses the `\eqref` command, for example,

```
...see \eqfullref{equation}{eq:alpha}...
```

The similar command `\fullpageref` is used to make the word “page” clickable, for example,

```
...see \eqfullref{equation}{eq:alpha} on
\fullpageref{eq:alpha}...
```

By default the command adds the word “page” to the text. You can override this choice using the optional parameter, e.g.

```
\fullpageref[The page]{eq:alpha} starts the discussion of...
```

The Perl script `fullref.pl` can be used to convert change all references to the `\fullref` commands. It works in the following way:

```
perl fullref.pl original.pl > result.pl
```

The script converts all instances of combinations “word `\ref{reference}`”, “word`\ref{reference}`” and “word`\pageref{reference}`” to “`\fullref{word}{reference}`”, and similarly for parenthesized references, `\eqref` commands, and page references. To prevent the converting, just put `\ref{reference}` or `\eqref{reference}` inside braces. The “word” here must not start with a backslash (i.e. must not be a macro itself). This prevents disastrous results for phrases like “see`\ref{a}`, `\ref{b}`”.

The distribution includes two sample files, `aomsample.tex` and `aomsample1.tex`, the latter being obtained from the former by the script `fullref.pl`.

Note that `\autoref` command of `hyperref` provides for another mechanism that achieves the same goal. Unlike `\fullref` command, the command `\autoref` tries to figure out the name of the reference from the context. See the manual [4] for more information.

2.5 Theorems

`\newtheorem` You can use the commands of `amsthm` package [12] like `\newtheorem{lem}{Lemma}` for numbered theorems, or `\newtheorem*{KL}{Klein’s Lemma}` for unnumbered theorems, or tune the numbering using the optional arguments of these commands.

To provide backward compatibility with some other classes used internally by the *Annals of Mathematics*, the class provides yet another optional argument for the command `\newtheorem`, allowing constructions like `\newtheorem[it]{lem}{Lemma}`. This optional parameter is not used in our typesetting.

The class provides two theorem styles:

plain: This is the default theorem style. It is used for Theorem, Lemma, Proposition, Conjecture, Corollary and Claim.

definition: This style is used for Definition, Remark, Notation, Condition, Example etc.

Note that AMS classes define the third theorem style, **remark**. In our class remarks are typeset in the **definition** style. To make the authors' lives easier we define the theorem style **remark**, which is identical to the theorem style **definition**.

2.6 Illustrations and color

The authors can use the `graphics`, `graphicx`, `PSTricks`, `pgf/tikz`, `Metapost` or other tools to include illustrations (see [13] for a comprehensive discussion of L^AT_EX graphics possibilities).

`\includecolorgraphics` The printed edition of the journal cannot use color illustrations. The online version can, although we recommend against the reliance of color since it might not be accessible for people with color perception problems. If you want to use color illustrations for the online version, you need to prepare two versions, a color one, and a BW (or grayscale one) with *identical sizes and contents*. The command `\includecolorgraphics[options]{color_file}{bw_file}` can be used to select the proper illustration: in the screen mode the color one is chosen, and otherwise the bw one is chosen.

2.7 Funding

`\funding` There is a special command for showing the support for the paper, `\funding[text]{sponsor}{grantid}`. Normally it prints the name of the sponsor and in parentheses the id of the grant, if it is not empty. However, you can override this using the optional argument of the command. For example, the following text

```
AB is grateful to \funding{NASA}{123GH456}, while MJ was supported
by \funding{NIH}{}. Both authors acknowledge \funding[the generous
help of other agencies]{Department of Defense}{Special project
grant}.
```

will expand to

```
% AB is grateful to NASA (123GH456), while MJ was supported
by NIH. Both authors acknowledge the generous
help of other agencies.
```

The command will save the information about the grants in the form suitable for automatic processing.

2.8 Bibliography

The authors are encouraged to use BibT_EX for uniform style of bibliography. The distribution includes the BST files `aomplain.bst` and `aomalpha.bst`. These files have several additional non-standard fields:

mrnumber: MathSciNet number for the article.

zblnumber: Zentralblatt number for the article.

doi: DOI number for the article.

jfmnumber: JFM number for the article.

arxiv: ArXiv reference for the ArXiv manuscript.

url: If the reference is available online, the corresponding url.

venue: (for **conference** entries) The place where the conference took place.

sortyear: Some entries do not have a year set up (e.g. some **unpublished** entries. If you have several entries from the same author, some with a year, and some without, you may want to put them in a certain order. The field **sortyear** overrides **year** for the sorting purposes.

titlenote: this field is like **note**, but is typeset immediately after a title. It should be used for additional information, for example,

```
@Book{Knuth94:TheTeXbook,
  author = {Knuth, Donald Ervin},
  title = {The \TeX book},
  publisher = {Addison-Wesley Publishing Company},
  year = 1994,
  series = {Computers \& Typesetting A},
  address = {Reading, MA},
  titlenote = {with illustrations by Duane Bibby}
}
```

totalpages: some articles (especially published in an electronic format) do not have start and end page numbers; instead you may put the total number of pages. If both **pages** and **totalpages** are present, **pages** take precedence.

`\doi` There are several databases routinely used in the science and mathematics communities. Among them are DOI, MathSciNet, Zentralblatt, Jahrbuch Database, `\zbl` ArXiv. Many bibliographies include references to these databases. The commands `\jfm` `\doi`, `\mr`, `\zbl`, `\jfm`, `\arxiv` are used to typeset these references. If you use `\arxiv` BibTeX, these commands are automatically used for the corresponding fields in your database entries.

2.9 Papers in languages other than English

The recommended way to typeset papers in languages other than English is *babel* package [10]. For example, to typeset a paper in French (with an English abstract, see below), one puts in the preamble

```
\usepackage[utf8]{inputenc}
\usepackage[english,frenchb]{babel}
```

Such papers often contain several abstracts: for example, in the language the paper is written *and* in English. Accordingly, *aomart* allows several abstracts. Each abstract must be put inside a group with the corresponding language selected using `\selectlanguage` command, for example

```
{\selectlanguage{french}%
```

```
\begin{abstract}
  French abstract
\end{abstract}}

{\selectlanguage{english}%
\begin{abstract}
  English abstract
\end{abstract}}
```

3 Implementation

3.1 Identification

We start with the declaration who we are. Most `.dtx` files put driver code in a separate driver file `.drv`. We roll this code into the main file, and use the pseudo-guard `<gobble>` for it.

```
1 <(class)\NeedsTeXFormat{LaTeX2e}
2 <*gobble>
3 \ProvidesFile{aomart.dtx}
4 </gobble>
5 (class)\ProvidesClass{aomart}
6 [2025/01/20 v1.32 Typesetting articles for the Annals of Mathematics]
```

And the driver code:

```
7 <*gobble>
8 \documentclass{ltxdoc}
9 \usepackage{array,booktabs,amsmath,graphics}
10 \let\widebar\overline
11 \usepackage{url}
12 \usepackage{amsfonts,yhmath}
13 \usepackage[breaklinks,colorlinks,linkcolor=black,citecolor=black,
14             pagecolor=black,urlcolor=black,hyperindex=false]{hyperref}
15 \PageIndex
16 \CodelineIndex
17 \RecordChanges
18 \EnableCrossrefs
19 \begin{document}
20   \DocInput{aomart.dtx}
21 \end{document}
22 </gobble>
23 <*class>
```

3.2 Options

The size-changing options produce a warning:

```
24 \long\def\@om@size@warning#1{%
25   \ClassWarning{aomart}{Size-changing option #1 will not be
26     honored}}%
27 \DeclareOption{8pt}{\@om@size@warning{\CurrentOption}}%
28 \DeclareOption{9pt}{\@om@size@warning{\CurrentOption}}%
29 \DeclareOption{10pt}{\@om@size@warning{\CurrentOption}}%
30 \DeclareOption{11pt}{\@om@size@warning{\CurrentOption}}%
31 \DeclareOption{12pt}{\@om@size@warning{\CurrentOption}}%
```

`\if@aom@manuscript@mode` Check whether we are in the manuscript mode

```
32 \newif\if@aom@manuscript@mode
33 \@aom@manuscript@modefalse
34 \DeclareOption{manuscript}{\@aom@manuscript@modetrue}
```

`\if@aom@screen@mode` Check whether we are in the screen mode

```
35 \newif\if@aom@screen@mode
36 \@aom@screen@modefalse
37 \DeclareOption{screen}{\@aom@screen@modetrue}
```

`\if@aom@olddoi` DOI processing is different in the “old” and new mode.

```
38 \newif\if@aom@olddoi
39 \@aom@olddoifalse
40 \DeclareOption{olddoi}{\@aom@olddoittrue}
```

`\if@aom@doiMMXVI` DOI processing is different in the 2016 and new mode

```
41 \newif\if@aom@doiMMXVI
42 \@aom@doiMMXVIfalse
43 \DeclareOption{doi2016}{\@aom@doiMMXVItrue}
```

`\if@aom@oldkeywords` Keywords processing is different in the “old” and new mode.

```
44 \newif\if@aom@oldkeywords
45 \@aom@oldkeywordsfalse
46 \DeclareOption{oldkeywords}{\@aom@oldkeywordstrue}
```

`\if@aom@printscheme`

```
47 \newif\if@aom@printscheme
48 \@aom@printschemefalse
49 \DeclareOption{printscheme}{\@aom@printschemetrue}
```

All other options are passed to `amsart`:

```
50 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{amsart}}
```

Now we read the configuration file

```
51 \InputIfFileExists{aomart.cfg}{%
52 \ClassInfo{aomart}{%
53 Loading configuration file aomart.cfg}}{%
54 \ClassInfo{aomart}{%
55 Configuration file aomart.cfg is not found}}
```

And process the options:

```
56 \ProcessOptions\relax
```

3.3 Loading Class and Packages

`\@makefnmark@kernel` AMS redefines `\@makefnmark`. Here we return to the kernel version

```
57 \let\@makefnmark@kernel\@makefnmark
```

We start with the base class

```
58 \LoadClass[11pt]{amsart}
```

`\@makefnmar` Restoring the kernel version

```
59 \let\@makefnmark\@makefnmark@kernel
```

`\@citex` We redefine this macro early in case some package wants to patch it. Basically house style for repeated citations is not [1, 2, 3], but [1], [2], and [3].

Note that we do not want to use `\andify` since it requires fine control of expansion. Rather, we just count the number of commas. Below `\@tempcnta` is the total number of cites, and `\@tempcntb` is the current cite.

```
60 \def\@citex[#1]#2{\leavevmode
61 \@tempcnta=0
62 \@for\@citeb:=#2\do{\advance\@tempcnta by 1}%
63 \@tempcntb=1
```

```

64 \let\citea\@empty
65 \cite{\@for\citeb:=#2\do
66   {\citea\def\citea[], []%
67     \advance\tempcntb by 1
68     \ifnum\tempcnta=\tempcntb\relax
69       \ifnum\tempcnta=2\relax
70         \def\citea[] and~[]%
71       \else
72         \def\citea[], and~[]%
73       \fi
74     \fi
75     \edef\citeb{\expandafter\@firstofone\citeb\@empty}%
76     \if@files\immediate\write\@auxout{\string\citation{\citeb}}\fi
77     \@ifundefined{b@\citeb}{\hbox{\reset@font\bfseries ?}}%
78     \G@refundefinedtrue
79     \@latex@warning
80     {Citation '\citeb' on page \thepage \space undefined}%
81     {\cite@ofmt{\csname b@\citeb\endcsname}}{\#1}}

```

A bunch of packages:

```

82 \RequirePackage{fancyhdr, lastpage, ifpdf, graphicx}
83 \RequirePackage[breaklinks,colorlinks]{hyperref}
84 \if@aom@screen@mode
85 \hypersetup{linkcolor=blue,citecolor=blue,
86   urlcolor=blue}%
87 \else\if@aom@manuscript@mode
88 \hypersetup{linkcolor=blue,citecolor=blue,
89   urlcolor=blue}%
90 \else
91 \hypersetup{linkcolor=black,citecolor=black,
92   urlcolor=black}%
93 \fi\fi
94 \urlstyle{rm}

```

Amsart has `\collect@body` macro. However, we want the `\long` version, so we use `environ`

```

95 \RequirePackage{environ}

```

3.4 Internationalization

There are some papers published in languages other than English. The `Babel` is expected to be used for them. Here we add some macros extending captions for these languages.

First, let us define English defaults:

```

\@aom@by This is just “By” in English:

```

```

96 \def\@aom@by{By}

```

```

\@aom@and This is “and” in English:

```

```

97 \def\@aom@and{and}

```

Now we can define internationalization:

```

98 \AtBeginDocument{\@ifpackageloaded{babel}{%

```



```

99 \addto\captionfrench{\def\@aom@by{Par}\def\@aom@and{et}}%
100 \addto\captionsgerman{\def\@aom@by{Von}\def\@aom@and{und}}%
101 \addto\captionsenglish{\def\@aom@by{By}\def\@aom@and{and}}{}}

```

3.5 Fonts

We use yhmath for large symbols:

```
102 \RequirePackage{yhmath}
```

Since version 1.2 ymath no longer makes its large symbols default. We override this

```
103 \DeclareSymbolFont{largesymbols}{OMX}{yhext}{m}{n}
```

`\widehat` The way `\widehat` and `\widetilde` are implemented in ymath is buggy, see `\widetilde` https://www.reddit.com/r/LaTeX/comments/2j7mtn/usepackageamsmath_vs_usepackageyhmath_and_the/. We use AMS definitions instead

```

104 \xdef\widehat#1{\noexpand\@mathmeasure\z@\textstyle{#1}%
105 \noexpand\ifdim\noexpand\wd\z@>\tw@ em%
106 \mathaccent"0\hexnumber@\symAMSb 5B{#1}%
107 \noexpand\else\mathaccent"0362{#1}\noexpand\fi}
108 \xdef\widetilde#1{\noexpand\@mathmeasure\z@\textstyle{#1}%
109 \noexpand\ifdim\noexpand\wd\z@>\tw@ em%
110 \mathaccent"0\hexnumber@\symAMSb 5D{#1}%
111 \noexpand\else\mathaccent"0365{#1}\noexpand\fi}

```

We need cmtiup package, but we may find out it is not installed.

```

112 \IfFileExists{cmtiup.sty}{%
113 \RequirePackage{cmtiup}}{%
114 \ClassWarning{aomart}{The package mdputu is not found.\MessageBreak
115 You need this package to get italics with upright digits!}}

```

`\specialdigits` A legacy macro. We do not need it anymore.

```

116 \def\specialdigits{}%
117 \let\sisshape=\itshape
118 \let\textsi=\textit

```

The amsart class defines several options for different font sizes (10pt, 11pt, etc). We have just one design size for the articles.

`\@typesizes` The font information in amsart is stored in `\@typesizes` macro. It has 11 type-sizes: 5 below and 5 above `\normalsize`.

```

119 \def\@typesizes{%
120 \or{\@vipt}{9}\or{\@viipt}{9}\or{\@viipt}{9}\or{\@ixpt}{12}%
121 \or{\@xpt}{13}%
122 \or{\@xipt}{14}% normalsize
123 \or{\@xiipt}{15}\or{13}{17}\or{\@xviipt}{20}%
124 \or{19}{23.2}\or{22}{27.8}}%
125 \normalsize \linespacing=\baselineskip

```

`\widebar` The functionality of `\widebar` coincides with that of amsmath `\overline`:

```
126 \let\widebar\overline
```

3.6 Page Dimensions and Paragraphing

```

\textwidth These are from the old aomamt2e:
\textheight 127 \setlength{\textwidth}{31pc}
              128 \setlength{\textheight}{48pc}

\evensidemargin The margins:
\oddsidemargin 129 \oddsidemargin=.65in
              130 \evensidemargin=.65in

\footins Some skips from aomamt2e:
\topskip 131 \setlength{\topskip}{12pt}
\abovedisplayskip 132 \setlength{\abovedisplayskip}{6.95pt plus3.5pt minus 3pt}
\belowdisplayskip 133 \setlength{\belowdisplayskip}{6.95pt plus4.5pt minus 3pt}
              134 \setlength{\skip\footins}{20pt}
              135 \setlength{\dimen\footins}{3in}

\footskip Some space for footnotes:
              136 \setlength\footskip{30pt}

\parskip Paragraph shape:
\parindent 137 \setlength{\parindent}{22pt}
              138 \setlength{\parskip}{\z@}

\widowpenalty We suppress widows and clubs:
\clubpenalty 139 \widowpenalty=10000
              140 \clubpenalty=10000

              AMS defines the margins for lists \AtBeginDocument. Our lists are tighter
141 \AtBeginDocument{%
142   \labelsep=5pt\relax
143   \settowidth\leftmargini{\labelenumi\hskip\labelsep}%
144   \leftmargin=\leftmargini
145   \labelwidth=\leftmargini \advance\labelwidth-\labelsep
146   \@listi}

\itemize
147 \renewenvironment{itemize}{%
148   \ifnum\@itemdepth>3 \toodeep
149   \else \advance\@itemdepth\@ne
150     \edef\@itemitem{labelitem\romannumeral\the\@itemdepth}%
151     \list{\csname\@itemitem\endcsname}%
152     {\settowidth\leftmargin{\labelitemi\hskip\labelsep}%
153       \def\makelabel##1{\hss\llap{\upshape##1}}}%
154   \fi
155 }{%
156   \endlist
157 }

```

3.7 Headers

```

\headsep Separation between the header and the body
158 \setlength{\headsep}{14pt}

\headheight Slightly increasing head height
159 \setlength{\headheight}{18.0pt}

\headrulewidth We do not want decorative rules in the journal:
\footrulewidth 160 \renewcommand{\headrulewidth}{0pt}
161 \renewcommand{\footrulewidth}{0pt}

@aom@linecount This is the box displayed in the manuscript mode
162 \if@aom@manuscript@mode
163 \newsavebox{\@aom@linecount}
164 \savebox{\@aom@linecount}[4em][t]{\parbox[t]{4em}{%
165 \@tempcnta\@ne\relax
166 \loop{\underline{\scriptsize\the\@tempcnta}}\@
167 \advance\@tempcnta by \@ne\ifnum\@tempcnta<43\repeat}}
168 \fi

```

It is easy to set up headers with fancyhdr:

```

169 \pagestyle{fancy}
170 \fancyhead{}
171 \fancyfoot{}
172 \fancyhead[CO]{\scriptsize\shorttitle}
173 \fancyhead[RO,LE]{\footnotesize\thepage}
174 \if@aom@manuscript@mode
175 \fancyhead[LE]{\footnotesize\thepage\begin{picture}(0,0)%
176 \put(-26,-25){\usebox{\@aom@linecount}}}%
177 \end{picture}}
178 \fancyhead[LO]{\begin{picture}(0,0)%
179 \put(-21,-25){\usebox{\@aom@linecount}}}%
180 \end{picture}}
181 \fancyfoot[C]{\scriptsize Proof: page numbers may be temporary}
182 \fi
183 \fancyhead[CE]{\scriptsize\MakeUppercase\shortauthors}

```

The first page has the special headers. The style `firstpage` is invoked by `amsart`; here we just redefine it.

```

184 \fancypagestyle{firstpage}{%
185 \fancyhf{}%
186 \if@aom@manuscript@mode
187 \lhead{\begin{picture}(0,0)%
188 \put(-21,-25){\usebox{\@aom@linecount}}}%
189 \end{picture}}
190 \fi
191 \chead{\scriptsize%
192 \href{\@annalsurl}{Annals of Mathematics} \textbf{\currentvolume}
193 (\currentyear),

```

We always print the starting page. However, we print the last page only if it does not coincide with the first page. There are two cases here: first, the last page may still be `\pageref{LastPage}`. In this case we need to extract the numerical value

of the counter—note that hyperref is in action! Second, we could redefine the last page, and it is no longer `\pageref{LastPage}`. In this case we need to compare the value with the first page.

```

194 \start@page%
195 \def\tempa{\pageref{LastPage}}%
196 \edef\tempb{\start@page}%
197 \ifx\tempa\end@page
198 \edef\tempa{\HyPsd@@@pageref{LastPage}}%
199 \else
200 \edef\tempa{\end@page}%
201 \fi
202 \ifx\tempa\tempb\else--\end@page\fi\
203 \ifx\@doinumber\@empty\else
204 \edef\@doinumber{\@doinumber}%
205 \expandafter\doi\expandafter{\@doinumber}\fi}%
206 \cfoot{\footnotesize\thepage}}%

```

`\annalsurl` The command to set up the URL of the journal

```

207 \def\annalsurl#1{\gdef\@annalsurl{#1}}
208 \annalsurl{http://annals.math.princeton.edu/about}

```

3.8 Top Matter Macros

We make these macros allowed only in the preamble:

```

209 \@onlypreamble{\title}
210 \@onlypreamble{\author}
211 \@onlypreamble{\contrib}
212 \@onlypreamble{\email}
213 \@onlypreamble{\address}
214 \@onlypreamble{\curraddr}
215 \@onlypreamble{\urladdr}
216 \@onlypreamble{\orcid}
217 \@onlypreamble{\givenname}
218 \@onlypreamble{\fulladdress}
219 \@onlypreamble{\surname}
220 \@onlypreamble{\thanks}
221 \@onlypreamble{\keyword}
222 \@onlypreamble{\subject}
223 \@onlypreamble{\received}
224 \@onlypreamble{\revised}
225 \@onlypreamble{\accepted}
226 \@onlypreamble{\published}
227 \@onlypreamble{\publishedonline}
228 \@onlypreamble{\proposed}
229 \@onlypreamble{\seconded}
230 \@onlypreamble{\corresponding}
231 \@onlypreamble{\editor}
232 \@onlypreamble{\version}
233 \@onlypreamble{\volumenumber}
234 \@onlypreamble{\issuenummer}
235 \@onlypreamble{\publicationyear}
236 \@onlypreamble{\copyrightnote}
237 \@onlypreamble{\copyrighyear}

```

```

238 \@onlypreamble{\papernumber}
239 \@onlypreamble{\startpage}
240 \@onlypreamble{\endpage}
241 \@onlypreamble{\doinumber}
242 \@onlypreamble{\mrnumber}
243 \@onlypreamble{\zblnumber}
244 \@onlypreamble{\arxivnumber}

```

Most top matter macros are defined in amsart. Here we just add some new macros and redefine some.

`\fulladdress` We store the information to output it later in the rpi file

```

\givenname 245 \def\@names{}
\surname 246 \def\givenname#1{\g@addto@macro\@names{givenname=#1;}}
247 \def\surname#1{\g@addto@macro\@names{surname=#1;}}
248 \def\fulladdress#1{\g@addto@macro\@names{fulladdress=#1;}}

```

`\author` We add mangling of `\@names` to the amsart macro

```

249 \renewcommand{\author}[2][{}]{%
250   \ifx\@empty\authors
251     \gdef\authors{#2}%
252     \g@addto@macro\@names{author=#2;}%
253   \else
254     \g@addto@macro\authors{\and#2}%
255     \g@addto@macro\@names{\and author=#2;}%
256   \fi
257   \gdef\@om@current@orcid@target{\authors}%
258   \@ifnotempty{#1}{%
259     \ifx\@empty\shortauthors
260       \gdef\shortauthors{#1}%
261     \else
262       \g@addto@macro\shortauthors{\and#1}%
263     \fi
264   }%
265   \g@addto@macro\addresses{\author{#2}}%
266 }
267 \edef\author{\@nx\@dblarg
268   \@xp\@nx\csname\string\author\endcsname}

```

`\@currentcontribution` The current contribution

```
269 \def\@currentcontribution{}
```

`\@currentcontributors` The current contributors with the same contribution

```
270 \def\@currentcontributors{}
```

`\contribs` All contributors to the paper

```
271 \def\contribs{}
```

`\if@startcontribgroup` A switch whether the new group is started

```
272 \newif\if@startcontribgroup
273 \startcontribgroupfalse
```

`\@processcurrentcontribgroup` Add current contributors to `\contributors`

```
274 \def\@processcurrentcontribgroup{%
275   \ifx\@currentcontributors\@empty\else
276     \def\@and{\upshape \@aom@and}%
277     \author@andify\@currentcontributors
278     \ifx\contribs\@empty\else
279       \g@addto@macro\contribs{\and}%
280     \fi
281     \expandafter\g@addto@macro\expandafter\contribs
282     \expandafter{\@currentcontribution}%
283     \g@addto@macro\contribs{\space}%
284     \expandafter\g@addto@macro\expandafter\contribs
285     \expandafter{\@currentcontributors}%
286   \fi
287 }
```

`\contrib` The processing of contributors. Contributors are separated into groups with the same contribution. Within the group one can omit the contribution.

```
288 \renewcommand{\contrib}[2][]{%
289   \def\@tempa{#1}%
290   \gdef\@om@current@orcid@target{\@currentcontributors}%
291   \@startcontribgrouptrue
292   \ifx\@tempa\@empty\relax
293     \ifx\@currentcontribution\@empty\relax
294       \ClassError{aomart}{You must define contribution for
295         contributors}{The first \contrib command must have the
296         optional argument indicating the contribution}%
297     \else
298       \@startcontribgroupfalse
299     \fi
300   \fi
301   \ifx\@currentcontribution\@tempa\relax
302     \@startcontribgroupfalse
303   \fi
304   \if@startcontribgroup
305     \@processcurrentcontribgroup
306     \gdef\@currentcontribution{#1}%
307     \gdef\@currentcontributors{#2}%
308   \else
309     \g@addto@macro\@currentcontributors{\and#2}%
310   \fi
311   \g@addto@macro\@names{\and contributor=#2;}%
312   \g@addto@macro\@names{role=}%
313   \expandafter\g@addto@macro\expandafter%
314   \@names\expandafter{\@currentcontribution}%
315   \g@addto@macro\@names{;}%
316   \g@addto@macro\addresses{\author{#2}}%
317 }
```

`\email` We change amsart macro to output metadata

```
318 \renewcommand{\email}[2][]{%
319   \g@addto@macro\addresses{\email{#1}{#2}}%
320   \g@addto@macro\@names{email=#2;}%
321 }
```

`\urladdr` We change amsart macro to output metadata

```
322 \renewcommand{\urladdr}[2] [] {%
323   \g@addto@macro\addresses{\urladdr{#1}{#2}}%
324   \g@addto@macro\@names{\urladdr=#2;}%
325 }
```

`\aom@current@orcid@target` Each new orcid can be added either to the authors or to the contributors. This macro defines where it goes

```
326 \def\aom@current@orcid@target{\authors}
```

`\orcid` Orcid also outputs metadata

```
327 \newcommand{\orcid}[1] {%
328   \g@addto@macro\addresses{\orcid{#1}}%
329   \g@addto@macro\@names{\orcid=#1;}%
330   \expandafter\g@addto@macro\aom@current@orcid@target{\aom@orcidlink{#1}}%
331 }
```

`\aom@orcidlink` The package orcidlink [14] requires TikZ, so here we reproduce its functionality using our own version of orcid logo. Note that the original logo is licensed under CC0, see https://orcid.figshare.com/articles/figure/ORCID_id_icon_graphics/5008697

```
332 \newcommand\aom@orcidlink[1]{\kern0.2ex\href{https://orcid.org/#1}{\includecolorgraphics[height=1em]{orcidlogo.png}}}
```

`\keyword` Actually amsart has `\keywords` macro. It redefines `\@keywords`. Our macro adds to the stack instead.

```
333 \def\keyword#1{\ifx\@keywords\@empty\gdef\@keywords{#1}\else
334   \g@addto@macro\@keywords{, #1}\fi}
```

`\subject` Subjects.

```
335 \let\@primarysubjects\@empty
336 \let\@secondarysubjects\@empty
337 \let\@primaryscheme\@empty
338 \let\@secondaryscheme\@empty
339 \def\subject#1#2#3{%
340   \expandafter\ifx\csname @#1subjects\endcsname\@empty\relax
341     \expandafter\gdef\csname @#1subjects\endcsname{#3}%
342   \else
343     \expandafter\g@addto@macro\csname @#1subjects\endcsname{, #3}%
344   \fi
345   \if@aom@printscheme
346     \expandafter\g@addto@macro\csname @#1subjects\endcsname{%
347       ~(#2)}%
348   \fi}
```

`\formatdate` This just sends the date to the special macro `\@formatdate`

```
349 \def\formatdate#1{\@formatdate#1\@endformatdate}
```

`\@formatdate` This macro takes date in the form YYYY-MM-DD and properly formats it. Note how we delete the leading zero in dates like April 02.

```
350 \def\@formatdate#1-#2-#3\@endformatdate{%
351   \@tempcnta=#3\relax
352   \ifcase#2\or
```

```

353 January\or February\or March\or April\or May\or June\or
354 July\or August\or September\or October\or November\or December\fi
355 \space\the\@tempcnta,\space#1}

```

```

\received The following macros add stuff to the footnotes material:
\revised 356 \def\received#1{\def\@received{#1}}
\accepted 357 \let\@received\@empty
\published 358 \def\revised#1{\def\@revised{#1}}
\publishedonline 359 \let\@revised\@empty
360 \def\accepted#1{\def\@accepted{#1}}
361 \let\@accepted\@empty
362 \def\published#1{\def\@published{#1}}
363 \let\@published\@empty
364 \def\publishedonline#1{\def\@publishedonline{#1}}
365 \let\@publishedonline\@empty

```

The next macros mimic the functionality of `amsart \issueinfo` command. Note that `\issueinfo` still works.

```

\volednumber This sets the volume of the paper
366 \def\volednumber#1{\def\currentvolume{#1}}

\issuenumber This sets the issue of the paper:
367 \def\issuenumber#1{\def\currentissue{#1}}

\publicationyear This sets the year of the paper
368 \def\publicationyear#1{\def\currentyear{#1}}

\papernumber This is absent from the \issueinfo.
369 \def\papernumber#1{\def\currentpaper{#1}}
370 \papernumber{0000}

\startpage This defines the starting page of the paper. We have some nice features to set up
roman page numbers for editorial stuff—probably not needed for this journal at
this time...
371 \def\startpage#1{\pagenumbering{arabic}\setcounter{page}{#1}%
372 \def\start@page{#1}%
373 \ifnum\c@page<\z@ \pagenumbering{roman}\setcounter{page}{-#1}%
374 \def\start@page{\romannumeral#1}%
375 \fi}

\endpage This macro again has a twist in it: if the argument is not set, it calculates the last
page number itself.
376 \def\endpage#1{\def\@tempa{#1}%
377 \ifx\@tempa\@empty\def\end@page{\pageref{LastPage}}%
378 \else\def\end@page{#1}\fi}

\pagespan This macro is different from the one provided by amsart because we want to have
the option of automatic calculation of the last page number.
379 \def\pagespan#1#2{\startpage{#1}\endpage{#2}}
380 \pagespan{1}{}

```



```

\g@addto@abstract Syntactic sugar around \g@addto@macro
381 \def\g@addto@abstract#1{\g@addto@macro{\@aom@abstract}{#1}}

\@getabstract Amsart typesets the abstract in a box. We preserve this peculiarity, but we need
to put abstract in a macro to output in the rpi file.
382 \long\def\@aom@abstract{}
383 \long\def\@getabstract#1{%
384   \bgroup
385     \ifx\languagename\undefined
386       \def\languagename{english}%
387     \fi
388     \g@addto@abstract{<begin abstract }%
389     \expandafter\g@addto@abstract\expandafter{\languagename}>%
390     \g@addto@macro\@aom@abstract{#1}%
391     \g@addto@abstract{<end abstract }%
392     \expandafter\g@addto@abstract\expandafter{\languagename}>%
393   \egroup
394   \ifx\maketitle\relax
395     \ClassWarning{aomart}{Abstract should precede
396       \protect\maketitle\space in AMS derived classes}%
397   \fi
398   \global\setbox\abstractbox=\vtop\bgroup%
399   \box\abstractbox
400   \vglue1pc%
401   {\centering\normalfont\normalsize\bfseries\abstractname\par\vglue1pc}%
402   \list{}{\labelwidth\z@%
403     \leftmargin3pc \rightmargin\leftmargin%
404     \listparindent\normalparindent \itemindent\normalparindent%
405     \parsep\z@ \@plus\p@%
406     \let\fullwidthdisplay\relax%
407   }%
408   \item[]\normalfont\Small#1
409   \endlist\egroup}

abstract This puts abstract in a box and in a macro. Wasteful, but backward compatible
410 \renewenvironment{abstract}{\Collect@Body\@getabstract}{%
411   \ifx\@setabstract\relax\@setabstracta\fi}

\proposed We do not typeset the name of the proposer
412 \let\proposed@gobble

\seconded Or the seconder
413 \let\seconded@gobble

\corresponding This is the corresponding author—again not typeset
414 \let\corresponding@gobble

\version We do not typeset the current version of the manuscript either...
415 \let\version@gobble

\doinumber Now databases' numbers of the article:
\mrnumber 416 \def\doinumber#1{\gdef\@doinumber{#1}}
\zblnumber 417 \doinumber{10.4007/annals.\currentyear.\currentvolume.\currentissue.\currentpaper}
\arxivnumber

```

```

418 \def\mrnumber#1{\gdef\@mrnumber{#1}}
419 \mrnumber{}
420 \def\zblnumber#1{\gdef\@zblnumber{#1}}
421 \zblnumber{}
422 \def\arxivnumber#1{\gdef\@arxivnumber{#1}}
423 \arxivnumber{}

```

`\copyrightyear` This is the copyright year in case it does not coincide with the publication year:

```

424 \def\copyrightyear#1{\def\@copyrightyear{#1}}
425 \copyrightyear{}

```

`\copyrightnote` This is the copyrightnote. The default has some trickery with the year:

```

426 \def\copyrightnote#1{\def\@copyrightnote{#1}}
427 \copyrightnote{\textcopyright~%
428 \ifx\@empty\@copyrightyear\currentyear\else\@copyrightyear\fi~%
429 Department of Mathematics, Princeton University}

```

3.9 Typesetting Top Matter

`\@mainrpi` We write the information about the paper into file.rpi (the The stream for the rpi file:

```

430 \newwrite\@mainrpi

```

`\aom@write@paper@info` This writes the information about the paper into the file jobname.rpi. Note that hyperref makes our life a little bit more complex

```

431 \def\aom@write@paper@info{%
432 \bgroup
433 \if@filesw
434 \openout\@mainrpi\jobname.rpi%
435 \def\and{\string\and\space}%
436 \ifx\r@LastPage\undefined
437 \edef\@tempa{\start@page}%
438 \else
439 \def\@tempc##1##2##3##4##5{##2}%
440 \edef\@tempa{\expandafter\@tempc\r@LastPage}%
441 \fi
442 \ifx\languagename\undefined
443 \def\languagename{english}%
444 \fi
445 \protected@write\@mainrpi{}%
446 {\@percentchar authors=\authors}%
447 \protected@write\@mainrpi{}%
448 {\@percentchar authors.information={\@names}}%
449 \protected@write\@mainrpi{}%
450 {\@percentchar title=\@title}%
451 \protected@write\@mainrpi{}%
452 {\@percentchar year=\currentyear}%
453 \protected@write\@mainrpi{}%
454 {\@percentchar volume=\currentvolume}%
455 \protected@write\@mainrpi{}%
456 {\@percentchar issue=\currentissue}%
457 \protected@write\@mainrpi{}%
458 {\@percentchar paper=\currentpaper}%

```

```

459 \protected@write\@mainrpi{%
460   {\@percentchar startpage=\start@page}%
461 \protected@write\@mainrpi{%
462   {\@percentchar endpage=\@tempa}%
463 \protected@write\@mainrpi{%
464   {\@percentchar doi=\@doinumber}%
465 \ifx\@zblnumber\@empty\else
466 \protected@write\@mainrpi{%
467   {\@percentchar zbl=\@zblnumber}%
468 \fi
469 \ifx\@mrnumber\@empty\else
470 \protected@write\@mainrpi{%
471   {\@percentchar mr=\@mrnumber}%
472 \fi
473 \ifx\@arxivnumber\@empty\else
474 \protected@write\@mainrpi{%
475   {\@percentchar arxiv=\@arxivnumber}%
476 \fi
477 \protected@write\@mainrpi{%
478   {\@percentchar subjects=Primary \@primarysubjects; Secondary:
479     \@secondarysubjects}%
480 \protected@write\@mainrpi{%
481   {\@percentchar keywords=\@keywords}%
482 \protected@write\@mainrpi{%
483   {\@percentchar abstract=\@aom@abstract}%
484 \protected@write\@mainrpi{%
485   {\@percentchar articlename=\@articlename}%
486   \@AtEndDocument{\closeout\@mainrpi}%
487   \fi
488 \egroup}

```

`\@maketitle@hook` We add writing the information to the hook:

```

489 \def\@maketitle@hook{\aom@write@paper@info\global\let\@maketitle@hook\@empty}

```

`\@settitle` We do not uppercase title. Also, we use this occasion to set PDF information:

```

490 \def\@settitle{\begin{center}%
491   \baselineskip20\p@relax
492   \bfseries\LARGE
493   \@title
494   \ifpdf
495     \hypersetup{pdftitle=\@title}%
496   \fi
497 \end{center}%
498 }

```

`\@setauthors` Now we typeset authors according to our specs. Again, we use this occasion to set some PDF information:

```

499 \def\@setauthors{%
500   \ifx\authors\@empty\relax\else
501     \begin{group}
502       \def\thanks{\protect\thanks@warning}%
503       \trivlist
504       \centering\footnotesize \@topsep30\p@relax
505       \advance\@topsep by -\baselineskip

```

```

506 \item\relax
507 \def\@and{\upshape \@aom@and}}%
508 \author@andify\authors
509 \ifpdf
510 \bgroup
511 \def\@aom@orcidlink##1{%
512 \xdef\@tempa{\authors}}%
513 \egroup
514 \hypersetup{pdfauthor=\@tempa}%
515 \fi
516 \def\{f\protect\linebreak}%
517 \small \@aom@by} \scshape\authors%
518 \@processcurrentcontribgroup
519 \ifx\@empty\contribs
520 \else
521 ,\penalty-3 \space \@setcontribs
522 \fi
523 \endtrivlist
524 \endgroup
525 \fi}

```

`\@setcontribs` Contributors are set up in the same way as authors:

```

526 \def\@setcontribs{%
527 \def\@and{\upshape \@aom@and}}%
528 \author@andify\contribs
529 \contribs
530 }

```

`\@adminfootnotes` We do not typeset keywords, so we change the definition:

```

531 \def\@adminfootnotes{%
532 \let\@makefnmark\relax \let\@thefnmark\relax
533 \ifx\@empty\@date\else \@footnotetext{\@setdate}\fi
534 \ifx\@empty\@subjclass\else \@footnotetext{\@setsubjclass}\fi
535 \ifx\@empty\@keywords\else\@setkeywords\fi
536 \ifx\@empty\@primarysubjects
537 \ifx\@empty\@secondarysubjects
538 \else\@setsubjects\fi
539 \else\@setsubjects\fi
540 \ifx\@empty\thankses\else \@footnotetext{%
541 \def\par{\let\par\@par}\@setthanks}}%
542 \fi
543 \ifx\@empty\@copyrightnote\else \@footnotetext{%
544 \def\par{\let\par\@par}\@copyrightnote\@addpunct.}%
545 \fi
546 }

```

`\@setkeywords` Typesetting keywords

```

547 \def\@setkeywords{%
548 \ifpdf
549 \hypersetup{pdfkeywords=\@keywords}}%
550 \fi
551 \if@aom@oldkeywords\else
552 \@footnotetext{Keywords: \@keywords}}%
553 \fi

```

554 }

`\@setsubjects` Setting subjects

```
555 \def\@setsubjects{%
556   \let\@subjects\@empty
557   \ifx\@primarysubjects\@empty\else
558     \edef\@subjects{Primary:~\@primarysubjects}%
559     \fi
560   \ifx\@secondarysubjects\@empty\else
561     \ifx\@primarysubjects\@empty
562       \edef\@subjects{Secondary:~\@secondarysubjects}%
563     \else
564       \edef\@subjects{\@subjects; Secondary:~\@secondarysubjects}%
565     \fi
566   \fi
567   \ifpdf
568     \hypersetup{pdfsubject=\@subjects}%
569   \fi
570   \if@aom@oldkeywords\else
571     \@footnotetext{AMS Classification:~\@subjects.}%
572   \fi
573 }
```

`\@@and` We want “and” in the footers to be lowercase. Since there is some uppercase involved, we protect it:

```
574 \def\@@and{\MakeLowercase{\@aom@and}}
```

3.10 Typesetting End Matter

End matter is typeset at the end of the paper.

`\enddoc@text` This is the main macro for typesetting endmatter.

```
575 \def\enddoc@text{%
576   \ifx\@empty\@translators \else\@settranslators\fi
577   \ifx\@empty\@received \else\@setreceived\fi
578   \ifx\@empty\@revised \else\@setrevised\fi
579   \ifx\@empty\@addresses \else\@setaddresses\fi}
```

`\@setreceived` A bunch of macros for setting centered dates

```
\@setreceived 580 \def\@setreceived{\centering(Received: \@received)\par}}
```

```
\@setaccepted 581 \def\@setrevised{\centering(Revised: \@revised)\par}}
```

```
\@setpublished 582 \def\@setaccepted{\centering(Accepted: \@accepted)\par}}
```

```
\@setpublishedonline 583 \def\@setpublished{\centering(Published: \@published)\par}}
```

```
584 \def\@setpublishedonline{\centering(Published online: \@publishedonline)\par}}
```

`\emailaddrname` We do not want the word “address” here:

```
585 \def\emailaddrname{\itshape E-mail}}
```

`\@setaddresses` The difference between our definition and the one in `amsart` is that we want the e-mail and URL to be clickable

```
586 \def\@setaddresses{\par
```

```
587   \nobreak \begingroup
```

```
588   \footnotesize
```

```

589 \def\author##1{\nobreak\addvspace\bigskipamount{\scshape##1\par}}%
590 \def\{\{\unskip, \ignorespaces}%
591 \interlinepenalty\@M
592 \def\address##1##2{\begingroup
593   \par\hangindent=22pt\hangafter=0\parindent=0pt
594   \@ifnotempty{##1}{(\ignorespaces##1\unskip) }%
595   {\ignorespaces##2}\par\endgroup}%
596 \def\curraddr##1##2{\begingroup
597   \@ifnotempty{##2}{\nobreak\indent\curraddrname
598     \@ifnotempty{##1}{, \ignorespaces\scshape##1\unskip}\hskip0.2em:\space
599     ##2\par}\endgroup}%
600 \def\email##1##2{\begingroup
601   \@ifnotempty{##2}{\nobreak\indent\emailaddrname
602     \@ifnotempty{##1}{, \ignorespaces##1\unskip}\hskip0.2em:\space
603     \href{mailto:##2}{\nolinkurl{##2}}\par}\endgroup}%
604 \def\urladdr##1##2{\begingroup
605   \@ifnotempty{##2}{\nobreak\indent
606     \@ifnotempty{##1}{, \ignorespaces##1\unskip}%
607     \url{##2}\par}\endgroup}%
608 \def\orcid##1{\begingroup
609   \@ifnotempty{##1}{\nobreak\indent
610     \url{https://orcid.org/##1}\par}\endgroup}%
611 \addresses
612 \endgroup
613 }

```

3.11 Sectioning

`\contentsnamefont` This is the font for the word “Contents”:

```
614 \renewcommand\contentsnamefont{\bfseries}
```

`\section` We want our sections to be centered and bold:

```

615 \def\section{\@startsection{section}{1}%
616   \z@{.7\linespacing\@plus\linespacing}{.5\linespacing}%
617   {\normalfont\bfseries\centering}}

```

`\subsection` We want our subsections to be indented and italic:

```

618 \def\subsection{\@startsection{subsection}{2}%
619   {\parindent}{.5\linespacing}{-.5em}%
620   {\normalfont\itshape}}

```

`\oldsubsections` This macro restores the values for `\subsection` spacing prior to v1.1.

```

621 \def\oldsubsections{%
622   \gdef\subsection{\@startsection{subsection}{2}%
623     {\parindent}{.5\linespacing\@plus.7\linespacing}{-.5em}%
624     {\normalfont\itshape}}

```

`\subsubsection` Subsubsections are formatted exactly like subsections:

```

625 \def\subsubsection{\@startsection{subsubsection}{3}%
626   {\parindent}{.5\linespacing}{-.5em}%
627   {\normalfont\itshape}}

```

`\Hy@AlphNoErr` The newer (circa 2012) `hyperref` defines this command. However, older versions do not. Here we provide it:

```
628 \providecommand\Hy@AlphNoErr[1]{%
629   \ifnum\value{#1}>26 %
630     Alph\number\value{#1}%
631   \else
632     \ifnum\value{#1}<1 %
633       Alph\number\value{#1}%
634     \else
635       \Alph{#1}%
636     \fi
637   \fi
638 }%
```

`\appendix` We redefine `appendix` to ensure the letter in section number is always upright:

```
639 \def\appendix{\par\c@section\z@ \c@subsection\z@
640   \gdef\theHsection{\Hy@AlphNoErr{section}}%
641   \let\sectionname\appendixname
642   \def\thesection{{\upshape\@Alph\c@section}}}
```

3.12 Figures and Tables

`\@captionheadfont` This is the font for the words “Figure” or “Table” in captions. Unlike `amsmath` with is small caps, we want just plain Roman font:

```
643 \def\@captionheadfont{\normalfont}
```

3.13 Theorems

Here we redefine three main style of `amsart`. Here are the arguments of `\newtheoremstyle` from [3]:

```

#1
\newtheoremstyle{NAME}%
#2 #3 #4
{ABOVESPACE}{BELOWSPACE}{BODYFONT}%
#5 #6 #7 #8
{INDENT}{HEADFONT}{HEADPUNCT}{HEADSPACE}%
#9
{CUSTOM-HEAD-SPEC}
```

In the `plain` style the name (“theorem”) is in small caps, the number is in normal font, the optional note is also in normal font, and the text is italics.

```
644 \newtheoremstyle{plain}{0.5\linespacing}{0.5\linespacing}{\sishape}%
645   {\parindent}{\scshape}{.}{0.5em}%
646   {\thmname{#1}\thmnumber{ #2}\thmnote{\normalfont{ } (#3)}}
```

In the `definition` style the name is italics, and the body font is upright:

```
647 \newtheoremstyle{definition}{0.5\linespacing}{0.5\linespacing}%
648   {\upshape}{\parindent}%
649   {\sishape}{.}{0.5em}%
650   {\thmname{#1}\thmnumber{ #2}\thmnote{\normalfont{ } (#3)}}
```

In our class there is no difference between `remark` and `definition` theorem styles:

```
651 \newtheoremstyle{remark}{0.5\linespacing}{0.5\linespacing}%
652   {\upshape}{\parindent}%
653   {\sishape}{.}{0.5em}%
654   {\thmname{#1}\thmnumber{ #2}\thmnote{\normalfont{} (#3)}}
```

`\newtheorem` For compatibility reasons we need to accept `\newtheorem` with optional first argument—and silently drop it. The problem is, there is `\newtheorem*`, so we need to check which one we deal with... The command `\xnthm` here is from `amsthm`; it does the real work with the real parameters.

```
655 \renewcommand{\newtheorem}{\@ifstar{\@aom@newthm@star}{\@aom@newthm}}
656 \def\@aom@newthm@star{\@ifnextchar[{\@aom@newthm@star@}{\@aom@newthm@star@[]}}
657 \def\@aom@newthm{\@ifnextchar[{\@aom@newthm@}{\@aom@newthm@[]}}
658 \def\@aom@newthm@star@[#1]{\@xnthm *}
659 \def\@aom@newthm@[#1]{\@xnthm \relax}
```

`proof` We want our proofs to be indented:

```
660 \renewenvironment{proof}[1][\proofname]{\par
661   \pushQED{\qed}%
662   \normalfont \topsep6\p@\@plus6\p@\relax
663   \trivlist
664   \item[\hskip\labelsep\hskip\parindent
665     \itshape
666     #1\@addpunct{.}]\ignorespaces
667 }{%
668   \popQED\endtrivlist\@endpefalse
669 }
```

3.14 Bibliography Macros

`\repeatedauthors` When the authors are repeated, we used change them to `\bysame`; we no more do this:

```
670 \def\repeatedauthors#1{\ClassWarning{aomart}{The command is obsolete}#1}
```

`\bysame` We no longer use `\bysame`

```
671 \let\bysame@@orig=\bysame
672 \def\bysame{\ClassWarning{aomart}{We no longer omit
673   repeated authors}\bysame@@orig}
```

`\doi` Typesetting doi...

```
674 \def\doi#1{%
675   \if@aom@doiMMXVI
676     \url{http://dx.doi.org/#1}%
677   \else
678     \if@aom@olddoi
679       \href{http://dx.doi.org/#1}{doi: \path{#1}}%
680     \else
681       \url{https://doi.org/#1}%
682     \fi
683   \fi}
```



```

\mr Typesetting urls
\zbl 684 \def\mr#1{\href{http://www.ams.org/mathscinet-getitem?mr=#1}{MR~\path{#1}}}
\arxiv 685 \def\zbl#1{\href{http://www.zentralblatt-math.org/zmath/en/search/?q=an:#1}{Zbl~\path{#1}}}
\jfm 686 \def\arxiv#1{\href{http://www.arxiv.org/abs/#1}{arXiv~\path{#1}}}
687 \def\jfm#1{\href{http://www.emis.de/cgi-bin/JFM-item?#1}{JFM~\path{#1}}}

\bibliofont We make this \small rather than \Small in amsart
688 \renewcommand{\bibliofont}{\small}

```

3.15 Additional Macros

`\EditorialComment` This macro is noop in normal mode, but is a tiny marginpar in the manuscript mode

```

689 \newcommand\EditorialComment[2][default]{\if@aom@manuscript@mode\bgroup
690 \expandafter\ifx\csname EditorialComment@#1\endcsname\relax
691 \else
692 \marginparwidth=75pt\marginpar{\scriptsize\raggedright#2}\fi
693 \egroup
694 \fi}

```

`\ECSelect`

```

695 \def\ECSelect#1{\if@aom@manuscript@mode
696 \@for\EC@level:=#1\do{%
697 \expandafter\gdef\csname
698 EditorialComment@EC@level\endcsname{\EditorialComment}}%
699 \fi}
700 \AtBeginDocument{\ECSelect{default}}

```

`\Highlight`

```

701 \newcommand\Highlight[2][default]{%
702 \expandafter\ifx\csname Highlight@#1\endcsname\relax
703 #2\else
704 \csname Highlight@#1\endcsname{#2}\fi}

```

`\HSelect`

```

705 \newcommand\HSelect[2][magenta]{\if@aom@manuscript@mode
706 \@for\TC@level:=#2\do{\expandafter
707 \gdef\csname Highlight@TC@level\endcsname##1{\bgroup
708 \Hy@colorlinksfalse
709 \def\Hy@colorlink####1{\begingroup}%
710 \def\Hy@endcolorlink{\endgroup}%
711 \color{#1}##1\egroup}}%
712 \fi}
713 \AtBeginDocument{\HSelect{default}}

```

`\@fullref` This macro creates a wide link for the reference. It has four parameters: the word (theorem, equation, ...), the “pre” punctuation, the reference and the “post” punctuation.

```

714 \def\@fullref#1#2#3#4{\hyperref[#3]{#1~#2\ref*{#3}#4}}

```

`\fullref` A reference without parentheses:

```

715 \newcommand{\fullref}[2]{\@fullref{#1}{-}{#2}{-}}

```

`\pfullref` A reference with parentheses:

```
716 \newcommand{\pfullref}[2]{\@fullref{#1}{(}{#2}{)}}
```

`\bfullref` A reference with brackets:

```
717 \newcommand{\bfullref}[2]{\@fullref{#1}{[}{#2}{]}}
```

`\eqfullref` Here we do not use the standard common `\@fullref` because we want `\eqref` to work...

```
718 \newcommand{\eqfullref}[2]{\hyperref[#2]{#1~\textup{\tagform@{\ref*{#2}}}}}
```

`\fullpageref` A wide link for page reference. Note that the word “page” can be omitted

```
719 \newcommand{\fullpageref}[2][page]{\hyperref[#2]{#1~\pageref*{#2}}}
```

`\eqnarray` While we do *not* recommend the use of `eqnarray`, we still would like to correct the ugly spacing around it...

```
720 \def\eqnarray{%
721   \stepcounter{equation}%
722   \def\@currentlabel{\p@equation\theequation}%
723   \global\@eqnswtrue
724   \m@th
725   \global\@eqcnt\z@
726   \tabskip\@centering
727   \let\\\@eqnocr
728   $$\arraycolsep1\p@
729   \everycr{\halign to\displaywidth\bgroup
730     \hskip\@centering$\displaystyle\tabskip\z@skip{##}$\@eqnrel
731     &\global\@eqcnt\@ne\hskip \tw@\arraycolsep \hfil$##$\hfil
732     &\global\@eqcnt\tw@ \hskip \tw@\arraycolsep
733     $\displaystyle{##}$\hfil\tabskip\@centering
734     &\global\@eqcnt\thr@@ \hb@xt@\z@\bgroup\hss##\egroup
735     \tabskip\z@skip
736     \cr
737 }
```

`\includecolorgraphics` Color graphics: select either the first or the second argument.

```
738 \newcommand\includecolorgraphics[3][\if@aom@screen@mode
739   \includegraphics[#1]{#2}\else
740   \includegraphics[#1]{#3}\fi}
```

`\funding` The macro to print grants. It adds to the rpi file the information about grants

```
741 \newcommand\funding[3][\%
742   \protected@write\@mainrpi{\%
743     {\@percentchar sponsor=#2, grantid=#3}\%
744     \def\@tempa{#1}\relax\%
745     \ifx\@tempa\@empty\relax
746       \def\@tempb{#3}\%
747       #2\%
748       \ifx\@tempb\@empty\relax\else\ (grant~#3)\fi
749     \else
750       #1
751     \fi}
```

3.16 End of Class

752 </class>

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Change History

v0.10	General: Bibliography styles update 2	Made remark theorem style identical to definition theorem style 32
	Documentation update 2	Made Roman font the default URL font 16
	Screen mode triggers special URL settings 16	<code>\@fullref</code> : Added macro 33
	<code>\ifaom@screen@mode</code> : Added screen mode 14	<code>\@setaddresses</code> : Deleted the word URL 29
	<code>\jfm</code> : Added macro 33	E-mail is now in Roman font . . 29
v0.2	General: First fully functional version 2	<code>\@setpublishedonline</code> : Decreased font 29
v0.3	General: Added DOI number in headers 19	<code>\@typesizes</code> : Corrected typo in the definition of Small 17
	Added package <code>mdputu</code> 17	Increased LARGE from 16 pt to 17 pt 17
	Documentation update 2	<code>\bfullref</code> : Added macro 34
	<code>\arxiv</code> : Added macro 33	<code>\emailaddrname</code> : Changed macro . 29
	<code>\corresponding</code> : Added macro . . 25	<code>\eqfullref</code> : Added macro 34
	<code>\doinumber</code> : Added macro 25	<code>\fullref</code> : Added macro 33
	<code>\EditorialComment</code> : Added macro . 33	<code>\pfullref</code> : Added macro 34
	<code>\ifaom@manuscript@mode</code> : Added manuscript mode 14	<code>proof</code> : Redefined macro 32
	<code>\mr</code> : Added macro 33	<code>\subsection</code> : Redefined macro . . 30
	<code>\mrnumber</code> : Added macro 25	v0.6
	<code>\newtheorem</code> : Redefined macro . . 32	General: Changes to bst files 2
	<code>\proposed</code> : Added macro 25	Fullref.pl is much less aggressive now 2
	<code>\seconded</code> : Added macro 25	<code>\@setauthors</code> : 'By' and 'and' are in Roman font now 27
	<code>\version</code> : Added macro 25	<code>\belowdisplayskip</code> : Changed belowdisplayskip 18
	<code>\zbl</code> : Added macro 33	<code>\bibliofont</code> : Changed default . . 33
	<code>\zblnumber</code> : Added macro 25	<code>\zbl</code> : Changed capitalization . . . 33
v0.4	General: Changed definition theorem style 31	v0.7
	Changed plain theorem style . . 31	General: Bibliography styles changed 2
	Deleted <code>lineno</code> package dependence 16	v0.8
	Deleted remark theorem style . . 32	General: Added <code>yhmath</code> 17
	Documentation update 2	Bibliography styles update 2
	Switched to upright digits in italics everywhere 17	Changed authors in header 19
	Used line numbers for headings . 19	Documentation update 2
	<code>\@aom@linecount</code> : Added macro . . 19	Switched to <code>cmtiup</code> 17
	<code>\enddoc@text</code> : Deleted many dates. 29	<code>\specialdigits</code> : Redefined to <code>noop</code> 17
v0.5	General: Added extra footer in manuscript mode 19	v0.9
	Corrected the byg with math in headers 19	General: Bibliography styles update 2
		Changed font for the folio on the first page 19
		Documentation update 2
		<code>\@and</code> : Redefined macro 29

\@setaddresses: Deleted spurious space in urladdress	29	\@om@write@paper@info: Added macro	26
\@setpublishedonline: Increased font	29	v1.14a \annalsurl: New url	20
abstract: Added parindent for the first par	25	v1.15 \doi: Doi according to the new Crossref recommendations . . .	32
\eqnarray: Redefined standard macro	34	\if@aom@doiMMXVI: Added another options	15
v1.0 General: Top matter macros are now only in preamble	2	v1.16 General: We require environ package	16
\doinumber: Added default	25	\@om@write@paper@info: Added names, abstract, subjects, keywords, zblnumber,	26
\papernumber: Added macro	24	Corrected the endpage bug	26
v1.1 General: In manuscript mode the links are always blue	16	\arxivnumber: Added macro	25
v1.10 \@and: Added internationalization	29	\author: Redefined amsart definition	21
\@aom@and: Added macro	16	abstract: Redefined using environ	25
\@aom@by: Added macro	16	\email: Redefined amsart definition	22
\@setauthors: Internationalization	27	\fulladdress: Redefined	21
\doi: Introduced the logic for old doi formatting	32	\givenname: Redefined	21
\if@aom@olddoi: Added old DOI processing	15	\surname: Redefined	21
v1.11 General: Added \fulladdress	2	\urladdr: Redefined amsart definition	23
Added new commands for copyright statement	2	v1.17 General: Added new field totalpages to the bibliography	2
Bibliography change: titlenote, deleted bysame	2	v1.17a General: Bug fixed in aomplain.bst	2
Deleted \repeatedauthors from the documentation	2	v1.18 General: New option oldkeywords and printing keywords and subjects by default	2
\@adminfootnotes: Added copyright statement	28	\@setaddresses: Added orcid	29
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