

# L<sup>A</sup>T<sub>E</sub>X Class for The *Annals of Mathematics*\*

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## 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. `yhmth` 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<sup>A</sup>T<sub>E</sub>X), `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<sup>A</sup>T<sub>E</sub>X 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

```

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

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.

## 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` The macro `\EditorialComment[comments]` typesets the comments on the margins in the manuscript mode, for example,

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

`\fullref` A set of macros is used to make more convenient clickable references in the on-  
`\pfullref`  
`\bfullref`  
`\eqfullref`  
`\fullpageref`

line versions of papers. The package `hyperref` [4] makes clickable reference numbers in the phrases like

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

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

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<sup>A</sup>T<sub>E</sub>X graphics possibilities).

## 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 BibTeX 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 the *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 [2024/11/13 v1.29 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

We start with the base class

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

A bunch of packages:

```
58 \RequirePackage{fancyhdr, lastpage, ifpdf, graphicx}
59 \RequirePackage[breaklinks,colorlinks]{hyperref}
60 \if@aom@screen@mode
61 \hypersetup{linkcolor=blue,citecolor=blue,
62   urlcolor=blue}%
63 \else\if@aom@manuscript@mode
64 \hypersetup{linkcolor=blue,citecolor=blue,
65   urlcolor=blue}%
66 \else
67 \hypersetup{linkcolor=black,citecolor=black,
68   urlcolor=black}%
69 \fi\fi
70 \urlstyle{rm}
```

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

```
71 \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:

```
72 \def\@aom@by{By}
```

`\@aom@and` This is “and” in English:

```
73 \def\@aom@and{and}
```

Now we can define internationalization:

```
74 \AtBeginDocument{\ifpackageloaded{babel}{%
75 \addto\captionsfrench{\def\@aom@by{Par}\def\@aom@and{et}}%
76 \addto\captionsgerman{\def\@aom@by{Von}\def\@aom@and{und}}%
77 \addto\captionsenglish{\def\@aom@by{By}\def\@aom@and{and}}{}}
```

### 3.5 Fonts

We use yhmath for large symbols:

```
78 \RequirePackage{yhmath}
```

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

```
79 \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/](https://www.reddit.com/r/LaTeX/comments/2j7mtn/usepackageamsmath_vs_usepackageyhmath_and_the/). We use AMS definitions instead

```
80 \xdef\widehat#1{\noexpand\@mathmeasure\z@\textstyle{#1}%
81 \noexpand\ifdim\noexpand\wd\z@>\tw@ em%
82 \mathaccent"0\hexnumber@\symAMSb 5B{#1}%
83 \noexpand\else\mathaccent"0362{#1}\noexpand\fi}
84 \xdef\widetilde#1{\noexpand\@mathmeasure\z@\textstyle{#1}%
85 \noexpand\ifdim\noexpand\wd\z@>\tw@ em%
86 \mathaccent"0\hexnumber@\symAMSb 5D{#1}%
87 \noexpand\else\mathaccent"0365{#1}\noexpand\fi}
```

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

```
88 \IfFileExists{cmtiup.sty}{%
89 \RequirePackage{cmtiup}}{%
90 \ClassWarning{aomart}{The package mdputu is not found.\MessageBreak
91 You need this package to get italics with upright digits!}}
```

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

```
92 \def\specialdigits{}%
93 \let\sisshape=\itshape
94 \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` .

```
95 \def\@typesizes{%
96   \or{\@viipt}{9}\or{\@viipt}{9}\or{\@viipt}{9}\or{\@ixpt}{12}%
97   \or{\@xpt}{13}%
98   \or{\@xipt}{14}% normalsize
99   \or{\@xiipt}{15}\or{13}{17}\or{\@xviipt}{20}%
100  \or{19}{23.2}\or{22}{27.8}}%
101 \normalsize \linespacing=\baselineskip
```

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

```
102 \let\widebar\overline
```

### 3.6 Page Dimensions and Paragraphing

`\textwidth` These are from the old `aomamlt2e`:

```
\textheight 103 \setlength{\textwidth}{31pc}
104 \setlength{\textheight}{48pc}
```

`\evensidemargin` The margins:

```
\oddsidemargin 105 \oddsidemargin=.65in
106 \evensidemargin=.65in
```

`\footins` Some skips from `aomamlt2e`:

```
\topskip 107 \setlength{\topskip}{12pt}
\abovedisplayskip 108 \setlength{\abovedisplayskip}{6.95pt plus3.5pt minus 3pt}
\belowdisplayskip 109 \setlength{\belowdisplayskip}{6.95pt plus4.5pt minus 3pt}
110 \setlength{\skip\footins}{20pt}
111 \setlength{\dimen\footins}{3in}
```

`\footskip` Some space for footnotes:

```
112 \setlength\footskip{30pt}
```

`\parskip` Paragraph shape:

```
\parindent 113 \setlength{\parindent}{22pt}
114 \setlength{\parskip}{\z@}
```

`\widowpenalty` We suppress widows and clubs:

```
\clubpenalty 115 \widowpenalty=10000
116 \clubpenalty=10000
```

### 3.7 Headers

`\headsep` Separation between the header and the body

```
117 \setlength{\headsep}{14pt}
```

`\headheight` Slightly increasing head height

```
118 \setlength{\headheight}{18.0pt}
```

`\headrulewidth` We do not want decorative rules in the journal:

```
\footrulewidth 119 \renewcommand{\headrulewidth}{0pt}
120 \renewcommand{\footrulewidth}{0pt}
```

`\@aom@linecount` This is the box displayed in the manuscript mode

```
121 \if@aom@manuscript@mode
122   \newsavebox{\@aom@linecount}
123   \savebox{\@aom@linecount}[4em][t]{\parbox[t]{4em}{%
124     \@tempcnta\@ne\relax
125     \loop{\underline{\scriptsize\the\@tempcnta}}\@
126     \advance\@tempcnta by \@ne\ifnum\@tempcnta<43\repeat}}
127 \fi
```

It is easy to set up headers with fancyhdr:

```
128 \pagestyle{fancy}
129 \fancyhead{}
130 \fancyfoot{}
131 \fancyhead[CO]{\scriptsize\shorttitle}
132 \fancyhead[RO,LE]{\footnotesize\thepage}
133 \if@aom@manuscript@mode
134   \fancyhead[LE]{\footnotesize\thepage\begin{picture}(0,0)%
135     \put(-26,-25){\usebox{\@aom@linecount}}%
136     \end{picture}}
137   \fancyhead[L0]{\begin{picture}(0,0)%
138     \put(-21,-25){\usebox{\@aom@linecount}}%
139     \end{picture}}
140   \fancyfoot[C]{\scriptsize Proof: page numbers may be temporary}
141 \fi
142 \fancyhead[CE]{\scriptsize\MakeUppercase\shortauthors}
```

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

```
143 \fancypagestyle{firstpage}{%
144   \fancyhf{}%
145   \if@aom@manuscript@mode
146     \lhead{\begin{picture}(0,0)%
147       \put(-21,-25){\usebox{\@aom@linecount}}%
148       \end{picture}}
149   \fi
150   \chead{\scriptsize%
151     \href{\@annalsurl}{Annals of Mathematics} \textbf{\currentvolume}
152     (\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.

```
153   \start@page%
154   \def\tempa{\pageref{LastPage}}%
155   \edef\tempb{\start@page}%
156   \ifx\tempa\end@page
157     \edef\tempa{\HyPsd@@@pageref{LastPage}}%
158   \else
159     \edef\tempa{\end@page}%
160   \fi
161   \ifx\tempa\tempb\else--\end@page\fi\fi
```

```

162 \ifx\@doinumber\@empty\else
163 \edef\@doinumber{\@doinumber}%
164 \expandafter\doi\expandafter{\@doinumber}\fi}%
165 \cfoot{\footnotesize\thepage}}%

```

```

\annalsurl The command to set up the URL of the journal
166 \def\annalsurl#1{\gdef\@annalsurl{#1}}
167 \annalsurl{http://annals.math.princeton.edu/about}

```

### 3.8 Top Matter Macros

We make these macros allowed only in the preamble:

```

168 \@onlypreamble{\title}
169 \@onlypreamble{\author}
170 \@onlypreamble{\contrib}
171 \@onlypreamble{\email}
172 \@onlypreamble{\address}
173 \@onlypreamble{\curraddr}
174 \@onlypreamble{\urladdr}
175 \@onlypreamble{\orcid}
176 \@onlypreamble{\givenname}
177 \@onlypreamble{\fulladdress}
178 \@onlypreamble{\surname}
179 \@onlypreamble{\thanks}
180 \@onlypreamble{\keyword}
181 \@onlypreamble{\subject}
182 \@onlypreamble{\received}
183 \@onlypreamble{\revised}
184 \@onlypreamble{\accepted}
185 \@onlypreamble{\published}
186 \@onlypreamble{\publishedonline}
187 \@onlypreamble{\proposed}
188 \@onlypreamble{\seconded}
189 \@onlypreamble{\corresponding}
190 \@onlypreamble{\editor}
191 \@onlypreamble{\version}
192 \@onlypreamble{\volumenumber}
193 \@onlypreamble{\issuenumber}
194 \@onlypreamble{\publicationyear}
195 \@onlypreamble{\copyrightnote}
196 \@onlypreamble{\copyrightyear}
197 \@onlypreamble{\papernumber}
198 \@onlypreamble{\startpage}
199 \@onlypreamble{\endpage}
200 \@onlypreamble{\doinumber}
201 \@onlypreamble{\mrnumber}
202 \@onlypreamble{\zblnumber}
203 \@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 204 \def\@names{}
\surname

```

```

205 \def\givenname#1{\g@addto@macro\@names{givenname=#1;}}
206 \def\surname#1{\g@addto@macro\@names{surname=#1;}}
207 \def\fulladdress#1{\g@addto@macro\@names{fulladdress=#1;}}

```

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

```

208 \renewcommand{\author}[2] []{%
209   \ifx\@empty\authors
210     \gdef\authors{#2}%
211     \g@addto@macro\@names{author=#2;}%
212   \else
213     \g@addto@macro\authors{\and#2}%
214     \g@addto@macro\@names{\and author=#2;}%
215   \fi
216   \gdef\@om@current@orcid@target{\authors}%
217   \@ifnotempty{#1}{%
218     \ifx\@empty\shortauthors
219       \gdef\shortauthors{#1}%
220     \else
221       \g@addto@macro\shortauthors{\and#1}%
222     \fi
223   }%
224   \g@addto@macro\addresses{\author{#2}}%
225 }
226 \edef\author{\@nx\@dblarg
227   \@xp\@nx\csname\string\author\endcsname}

```

`\@currentcontribution` The current contribution

```
228 \def\@currentcontribution{}
```

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

```
229 \def\@currentcontributors{}
```

`\contribs` All contributors to the paper

```
230 \def\contribs{}
```

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

```
231 \newif\if@startcontribgroup
232 \@startcontribgroupfalse

```

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

```

233 \def\@processcurrentcontribgroup{%
234   \ifx\@currentcontributors\@empty\else
235     \def\@and{\upshape \@om@and}%
236     \author@andify\@currentcontributors
237     \ifx\contribs\@empty\else
238       \g@addto@macro\contribs{\and}%
239     \fi
240     \expandafter\g@addto@macro\expandafter\contribs
241     \expandafter{\@currentcontribution}%
242     \g@addto@macro\contribs{\space}%
243     \expandafter\g@addto@macro\expandafter\contribs
244     \expandafter{\@currentcontributors}%
245   \fi
246 }

```

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

```

247 \renewcommand{\contrib}[2] [] {%
248   \def\@tempa{#1}%
249   \gdef\@om@current@orcid@target{\@currentcontributors}%
250   \@startcontribgrouptrue
251   \ifx\@tempa\@empty\relax
252     \ifx\@currentcontribution\@empty\relax
253       \ClassError{aomart}{You must define contribution for
254         contributors}{The first \contrib command must have the
255         optional argument indicating the contribution}%
256     \else
257       \@startcontribgroupfalse
258     \fi
259   \fi
260   \ifx\@currentcontribution\@tempa\relax
261     \@startcontribgroupfalse
262   \fi
263   \if@startcontribgroup
264     \@processcurrentcontribgroup
265     \gdef\@currentcontribution{#1}%
266     \gdef\@currentcontributors{#2}%
267   \else
268     \g@addto@macro\@currentcontributors{\and#2}%
269   \fi
270   \g@addto@macro\@names{\and contributor=#2;}%
271   \g@addto@macro\@names{role=}%
272   \expandafter\g@addto@macro\expandafter%
273   \@names\expandafter{\@currentcontribution}%
274   \g@addto@macro\@names{;}%
275   \g@addto@macro\addresses{\author{#2}}%
276 }

```

`\email` We change amsart macro to output metadata

```

277 \renewcommand{\email}[2] [] {%
278   \g@addto@macro\addresses{\email{#1}{#2}}%
279   \g@addto@macro\@names{email=#2;}%
280 }

```

`\urladdr` We change amsart macro to output metadata

```

281 \renewcommand{\urladdr}[2] [] {%
282   \g@addto@macro\addresses{\urladdr{#1}{#2}}%
283   \g@addto@macro\@names{urladdr=#2;}%
284 }

```

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

```

285 \def\@om@current@orcid@target{\authors}

```

`\orcid` Orcid also outputs metadata

```

286 \newcommand{\orcid}[1] {%
287   \g@addto@macro\addresses{\orcid{#1}}%
288   \g@addto@macro\@names{orcid=#1;}%

```

```

289 \expandafter\g@addto@macro\@om@current@orcid@target{\@om@orcidlink{#1}}%
290 }

\@om@orcidlink The package orcidlink [14] requires TikZ, so here we reproduce its function-
ality using our own version of orcid logo. Note that the original logo is li-
censes under CC0, see https://orcid.figshare.com/articles/figure/ORCID\_
id\_icon\_graphics/5008697
291 \newcommand\@om@orcidlink[1]{\kern0.2ex\href{https://orcid.org/#1}{\includegraphics[height=2e

\keyword Actually amsart has \keywords macro. It redefines \@keywords. Our macro adds
to the stack instead.
292 \def\keyword#1{\ifx\@keywords\@empty\gdef\@keywords{#1}\else
293 \g@addto@macro\@keywords{, #1}\fi}

\subject Subjects.
294 \let\@primarysubjects\@empty
295 \let\@secondarysubjects\@empty
296 \let\@primaryscheme\@empty
297 \let\@secondarieschme\@empty
298 \def\subject#1#2#3{%
299 \expandafter\ifx\csname @#1subjects\endcsname\@empty\relax
300 \expandafter\gdef\csname @#1subjects\endcsname{#3}%
301 \else
302 \expandafter\g@addto@macro\csname @#1subjects\endcsname{, #3}%
303 \fi
304 \if@om@printscheme
305 \expandafter\g@addto@macro\csname @#1subjects\endcsname{%
306 ~(#2)}%
307 \fi}

\formatdate This just sends the date to the special macro \@formatdate
308 \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.
309 \def\@formatdate#1-#2-#3\@endformatdate{%
310 \@tempcnta=#3\relax
311 \ifcase#2\or
312 January\or February\or March\or April\or May\or June\or
313 July\or August\or September\or October\or November\or December\fi
314 \space\the\@tempcnta,\space#1}

\received The following macros add stuff to the footnotes material:
\revised 315 \def\received#1{\def\@received{#1}}
\accepted 316 \let\@received\@empty
\published 317 \def\revised#1{\def\@revised{#1}}
\publishedonline 318 \let\@revised\@empty
319 \def\accepted#1{\def\@accepted{#1}}
320 \let\@accepted\@empty
321 \def\published#1{\def\@published{#1}}
322 \let\@published\@empty
323 \def\publishedonline#1{\def\@publishedonline{#1}}
324 \let\@publishedonline\@empty

```

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

```

\volumentnumber This sets the volume of the paper
325 \def\volumentnumber#1{\def\currentvolume{#1}}

\issuenumner This sets the issue of the paper:
326 \def\issuenumner#1{\def\currentissue{#1}}

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

\papernumber This is absent from the \issueinfo.
328 \def\papernumber#1{\def\currentpaper{#1}}
329 \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...
330 \def\startpage#1{\pagenumbering{arabic}\setcounter{page}{#1}%
331 \def\start@page{#1}%
332 \ifnum\c@page<\z@ \pagenumbering{roman}\setcounter{page}{-#1}%
333 \def\start@page{\romannumeral#1}%
334 \fi}

\endpage This macro again has a twist in it: if the argument is not set, it calculates the last
page number itself.
335 \def\endpage#1{\def\@tempa{#1}%
336 \ifx\@tempa\@empty\def\end@page{\pageref{LastPage}}%
337 \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.
338 \def\pagespan#1#2{\startpage{#1}\endpage{#2}}
339 \pagespan{1}{}

\g@addto@abstract Syntactic sugar around \g@addto@macro
340 \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.
341 \long\def\@aom@abstract{}
342 \long\def\@getabstract#1{%
343 \bgroup
344 \ifx\languagenamename\undefined
345 \def\languagenamename{english}%
346 \fi
347 \g@addto@abstract{<begin abstract }%
348 \expandafter\g@addto@abstract\expandafter{\languagenamename}%
349 \g@addto@macro\@aom@abstract{#1}%
350 \g@addto@abstract{<end abstract }%
351 \expandafter\g@addto@abstract\expandafter{\languagenamename}%
352 \egroup

```

```

353 \ifx\maketitle\relax
354   \ClassWarning{aomart}{Abstract should precede
355     \protect\maketitle\space in AMS derived classes}%
356 \fi
357 \global\setbox\abstractbox=\vtop\bgroup%
358   \box\abstractbox
359   \vglue1pc%
360   {\centering\normalfont\normalsize\bfseries\abstractname\par\vglue1pc}%
361   \list{}{\labelwidth\z@%
362     \leftmargin3pc \rightmargin\leftmargin%
363     \listparindent\normalparindent \itemindent\normalparindent%
364     \parsep\z@ \@plus\p@%
365     \let\fullwidthdisplay\relax%
366   }%
367   \item[]\normalfont\Small#1
368 \endlist\egroup}

```

**abstract** This puts abstract in a box *and* in a macro. Wasteful, but backward compatible

```

369 \renewenvironment{abstract}{\Collect@Body\@getabstract}{%
370   \ifx\@setabstract\relax\@setabstracta\fi}

```

**\proposed** We do not typeset the name of the proposer

```

371 \let\proposed\@gobble

```

**\seconded** Or the seconder

```

372 \let\seconded\@gobble

```

**\corresponding** This is the corresponding author—again not typeset

```

373 \let\corresponding\@gobble

```

**\version** We do not typeset the current version of the manuscript either...

```

374 \let\version\@gobble

```

**\doinumber** Now databases' numbers of the article:

```

\mrnumber 375 \def\doinumber#1{\gdef\@doinumber{#1}}
\zblnumber 376 \doinumber{10.4007/annals.\currentyear.\currentvolume.\currentissue.\currentpaper}
\arxivnumber 377 \def\mrnumber#1{\gdef\@mrnumber{#1}}
378 \mrnumber{}
379 \def\zblnumber#1{\gdef\@zblnumber{#1}}
380 \zblnumber{}
381 \def\arxivnumber#1{\gdef\@arxivnumber{#1}}
382 \arxivnumber{}

```

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

```

383 \def\copyrightyear#1{\def\@copyrightyear{#1}}
384 \copyrightyear{}

```

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

```

385 \def\copyrightnote#1{\def\@copyrightnote{#1}}
386 \copyrightnote{\textcopyright~%
387   \ifx\@empty\@copyrightyear\currentyear\else\@copyrightyear\fi~%
388   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:

```
389 \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

```
390 \def\@aom@write@paper@info{%
391   \bgroup
392   \if@filesw
393     \openout\@mainrpi\jobname.rpi%
394     \def\and{\string\and\space}%
395     \ifx\r@LastPage\@undefined
396       \edef\@tempa{\start@page}%
397     \else
398       \def\@tempc##1##2##3##4##5{##2}%
399       \edef\@tempa{\expandafter\@tempc\r@LastPage}%
400   \fi
401   \ifx\languagename\undefined
402     \def\languagename{english}%
403   \fi
404   \protected@write\@mainrpi{%
405     {\@percentchar authors=\authors}%
406   \protected@write\@mainrpi{%
407     {\@percentchar authors.information={\@names}}%
408   \protected@write\@mainrpi{%
409     {\@percentchar title=\@title}%
410   \protected@write\@mainrpi{%
411     {\@percentchar year=\currentyear}%
412   \protected@write\@mainrpi{%
413     {\@percentchar volume=\currentvolume}%
414   \protected@write\@mainrpi{%
415     {\@percentchar issue=\currentissue}%
416   \protected@write\@mainrpi{%
417     {\@percentchar paper=\currentpaper}%
418   \protected@write\@mainrpi{%
419     {\@percentchar startpage=\start@page}%
420   \protected@write\@mainrpi{%
421     {\@percentchar endpage=\@tempa}%
422   \protected@write\@mainrpi{%
423     {\@percentchar doi=\@doinumber}%
424   \ifx\@zblnumber\@empty\else
425   \protected@write\@mainrpi{%
426     {\@percentchar zbl=\@zblnumber}%
427   \fi
428   \ifx\@mrnumber\@empty\else
429   \protected@write\@mainrpi{%
430     {\@percentchar mr=\@mrnumber}%
431   \fi
432   \ifx\@arxivnumber\@empty\else
433   \protected@write\@mainrpi{%
434     {\@percentchar arxiv=\@arxivnumber}%
435   \fi
```

```

436 \protected@write\@mainrpi{%
437   {\@percentchar subjects=Primary \@primarysubjects; Secondary:
438     \@secondarysubjects}%
439 \protected@write\@mainrpi{%
440   {\@percentchar keywords=\@keywords}%
441 \protected@write\@mainrpi{%
442   {\@percentchar abstract=\@aom@abstract}%
443 \protected@write\@mainrpi{%
444   {\@percentchar articlelanguage=\@languagename}%
445 \AtEndDocument{\closeout\@mainrpi}%
446 \fi
447 \egroup}

```

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

```

448 \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:

```

449 \def\@settitle{\begin{center}%
450   \baselineskip20\p@\relax
451   \bfseries\LARGE
452   \@title
453   \ifpdf
454     \hypersetup{pdftitle=\@title}%
455   \fi
456 \end{center}}%
457 }

```

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

```

458 \def\@setauthors{%
459   \ifx\authors\@empty\relax\else
460     \begin{group}
461       \def\thanks{\protect\thanks@warning}%
462       \trivlist
463       \centering\footnotesize \@topsep30\p@\relax
464       \advance\@topsep by -\baselineskip
465       \item\relax
466       \def\@and{\upshape \@aom@and}%
467       \author@andify\authors
468       \ifpdf
469         \bgroup
470           \def\@aom@orcidlink##1{%
471             \xdef\@tempa{\authors}%
472           \egroup
473           \hypersetup{pdfauthor=\@tempa}%
474         \fi
475       \def\{\protect\linebreak}%
476       \small \@aom@by\ scshape\authors%
477       \@processcurrentcontribgroup
478       \ifx\@empty\contribs
479         \else
480           ,\penalty-3 \space \@setcontribs
481         \fi
482       \endtrivlist

```

```
483 \endgroup
484 \fi}
```

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

```
485 \def\@setcontribs{%
486 \def\@and{\upshape \@aom@and}}%
487 \author@andify\contribs
488 \contribs
489 }
```

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

```
490 \def\@adminfootnotes{%
491 \let\@makefnmark\relax \let\@thefnmark\relax
492 \ifx\@empty\@date\else \@footnotetext{\@setdate}\fi
493 \ifx\@empty\@subjclass\else \@footnotetext{\@setsubjclass}\fi
494 \ifx\@empty\@keywords\else\@setkeywords\fi
495 \ifx\@empty\@primarysubjects
496 \ifx\@empty\@secondarysubjects
497 \else\@setsubjects\fi
498 \else\@setsubjects\fi
499 \ifx\@empty\thankses\else \@footnotetext{%
500 \def\par{\let\par\@par}\@setthanks}}%
501 \fi
502 \ifx\@empty\@copyrightnote\else \@footnotetext{%
503 \def\par{\let\par\@par}\@copyrightnote\@addpunct.}%
504 \fi
505 }
```

`\@setkeywords` Typesetting keywords

```
506 \def\@setkeywords{%
507 \ifpdf
508 \hypersetup{pdfkeywords=\@keywords}}%
509 \fi
510 \if@aom@oldkeywords\else
511 \@footnotetext{Keywords: \@keywords}}%
512 \fi
513 }
```

`\@setsubjects` Setting subjects

```
514 \def\@setsubjects{%
515 \let\@subjects\@empty
516 \ifx\@primarysubjects\@empty\else
517 \edef\@subjects{Primary:~\@primarysubjects}}%
518 \fi
519 \ifx\@secondarysubjects\@empty\else
520 \ifx\@primarysubjects\@empty
521 \edef\@subjects{Secondary:~\@secondarysubjects}}%
522 \else
523 \edef\@subjects{\@subjects; Secondary:~\@secondarysubjects}}%
524 \fi
525 \fi
526 \ifpdf
527 \hypersetup{pdfsubject=\@subjects}}%
528 \fi
```

```

529 \if@aom@oldkeywords\else
530 \@footnotetext{AMS Classification:~\@subjects.}%
531 \fi
532 }

```

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

```
533 \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.

```

534 \def\enddoc@text{%
535 \ifx\@empty\@translators \else\settranslators\fi
536 \ifx\@empty\@received \else\setreceived\fi
537 \ifx\@empty\@revised \else\setrevised\fi
538 \ifx\@empty\addresses \else\setaddresses\fi}

```

\@setreceived A bunch of macros for setting centered dates

\@setrevised 539 \def\@setreceived{\centering(Received: \@received)\par}}

\@setaccepted 540 \def\@setrevised{\centering(Revised: \@revised)\par}}

\@setpublished 541 \def\@setaccepted{\centering(Accepted: \@accepted)\par}}

\@setpublishedonline 542 \def\@setpublished{\centering(Published: \@published)\par}}

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

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

```
544 \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

```

545 \def\@setaddresses{\par
546 \nobreak \begingroup
547 \footnotesize
548 \def\author##1{\nobreak\addvspace\bigskipamount{\scshape##1}\par}}%
549 \def\{\unskip, \ignorespaces}%
550 \interlinepenalty\M
551 \def\address##1##2{\begingroup
552 \par
553 \ifnotempty{##1}{\ignorespaces##1\unskip} }%
554 {\ignorespaces##2}\par\endgroup}%
555 \def\curraddr##1##2{\begingroup
556 \@ifnotempty{##2}{\nobreak\indent\curraddrname
557 \@ifnotempty{##1}{, \ignorespaces\scshape##1\unskip}\hskip0.2em:\space
558 ##2\par}\endgroup}%
559 \def\email##1##2{\begingroup
560 \@ifnotempty{##2}{\nobreak\indent\emailaddrname
561 \@ifnotempty{##1}{, \ignorespaces##1\unskip}\hskip0.2em:\space
562 \href{mailto:##2}{\nolinkurl{##2}}\par}\endgroup}%
563 \def\urladdr##1##2{\begingroup
564 \@ifnotempty{##2}{\nobreak\indent
565 \@ifnotempty{##1}{, \ignorespaces##1\unskip}}%

```

```

566     \url{##2}\par}\endgroup}%
567 \def\orcid##1{\begingroup
568   \ifnotempty{##1}{\nobreak\indent
569     \url{https://orcid.org/##1}\par}\endgroup}%
570 \addresses
571 \endgroup
572 }

```

### 3.11 Sectioning

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

```
573 \renewcommand\contentsnamefont{\bfseries}
```

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

```

574 \def\section{\@startsection{section}{1}%
575   \z@{.7\linespacing\@plus\linespacing}{.5\linespacing}%
576   {\normalfont\bfseries\centering}}

```

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

```

577 \def\subsection{\@startsection{subsection}{2}%
578   {\parindent}{.5\linespacing}{-.5em}%
579   {\normalfont\itshape}}

```

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

```

580 \def\oldsubsections{%
581   \gdef\subsection{\@startsection{subsection}{2}%
582     {\parindent}{.5\linespacing\@plus.7\linespacing}{-.5em}%
583     {\normalfont\itshape}}

```

`\subsubsection` Subsubsections are formatted exactly like subsections:

```

584 \def\subsubsection{\@startsection{subsubsection}{3}%
585   {\parindent}{.5\linespacing}{-.5em}%
586   {\normalfont\itshape}}

```

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

```

587 \providecommand\Hy@AlphNoErr[1]{%
588   \ifnum\value{#1}>26 %
589     Alph\number\value{#1}%
590   \else
591     \ifnum\value{#1}<1 %
592       Alph\number\value{#1}%
593     \else
594       \Alph{#1}%
595     \fi
596   \fi
597 }%

```

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

```

598 \def\appendix{\par\c@section\z@ \c@subsection\z@
599   \gdef\theHsection{\Hy@AlphNoErr{section}}%
600   \let\sectionname\appendixname
601   \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:  
602 `\def\@captionheadfont{\normalfont}`

### 3.13 Theorems

Here we redefine three main style of `amsmath`. 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.

```

603 \newtheoremstyle{plain}{0.5\linespacing}{0.5\linespacing}{\sishape}%
604 {\parindent}{\scshape}{.}{0.5em}%
605 {\thmname{#1}\thmnumber{ #2}\thmnote{\normalfont} (#3)}

```

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

```

606 \newtheoremstyle{definition}{0.5\linespacing}{0.5\linespacing}%
607 {\upshape}{\parindent}%
608 {\sishape}{.}{0.5em}%
609 {\thmname{#1}\thmnumber{ #2}\thmnote{\normalfont} (#3)}

```

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

```

610 \newtheoremstyle{remark}{0.5\linespacing}{0.5\linespacing}%
611 {\upshape}{\parindent}%
612 {\sishape}{.}{0.5em}%
613 {\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.

```

614 \renewcommand{\newtheorem}{\@ifstar{\@aom@newthm@star}{\@aom@newthm}}
615 \def\@aom@newthm@star{\@ifnextchar[{\@aom@newthm@star@}{\@aom@newthm@star@[]}}
616 \def\@aom@newthm{\@ifnextchar[{\@aom@newthm@}{\@aom@newthm@[]}}
617 \def\@aom@newthm@star@[#1]{\@xnthm *}
618 \def\@aom@newthm@[#1]{\@xnthm \relax}

```

`proof` We want our proofs to be indented:

```

619 \renewenvironment{proof}[1][\proofname]{\par
620 \pushQED{\qed}%
621 \normalfont \topsep6\p@\@plus6\p@\relax
622 \trivlist

```

```

623 \item[\hskip\labelsep\hskip\parindent
624 \itshape
625 #1\@addpunct{.}]\ignorespaces
626 }{
627 \popQED\endtrivlist\@endpefalse
628 }

```

### 3.14 Bibliography Macros

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

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

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

```

630 \let\bysame@@orig=\bysame
631 \def\bysame{\ClassWarning{aomart}{We no longer omit
632 repeated authors}\bysame@@orig}

```

`\doi` Typesetting doi...

```

633 \def\doi#1{
634 \if@aom@doiMMXVI
635 \url{http://dx.doi.org/#1}%
636 \else
637 \if@aom@olddoi
638 \href{http://dx.doi.org/#1}{doi: \path{#1}}%
639 \else
640 \url{https://doi.org/#1}%
641 \fi
642 \fi}

```

`\mr` Typesetting urls

```

\zbl 643 \def\mr#1{\href{http://www.ams.org/mathscinet-getitem?mr=#1}{MR~\path{#1}}}
\arxiv 644 \def\zbl#1{\href{http://www.zentralblatt-math.org/zmath/en/search/?q=an:#1}{Zbl~\path{#1}}}
\jfm 645 \def\arxiv#1{\href{http://www.arxiv.org/abs/#1}{arXiv~\path{#1}}}
646 \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`

```
647 \renewcommand{\bibliofont}{\small}
```

### 3.15 Additional Macros

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

```

648 \def\EditorialComment#1{\if@aom@manuscript@mode\bgroup
649 \marginparwidth=75pt\marginpar{\scriptsize\raggedright#1}\egroup\fi}

```

`\@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.

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

`\fullref` A reference without parentheses:

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

`\pfullref` A reference with parentheses:  
652 `\newcommand{\pfullref}[2]{\@fullref{#1}{\{#2\}}`

`\bfullref` A reference with brackets:  
653 `\newcommand{\bfullref}[2]{\@fullref{#1}{[#2]}}`

`\eqfullref` Here we do not use the standard common `\@fullref` because we want `\eqref` to work...  
654 `\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  
655 `\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...  
656 `\def\eqnarray{%`  
657 `\stepcounter{equation}%`  
658 `\def\@currentlabel{\p@equation\theequation}%`  
659 `\global\@eqnswtrue`  
660 `\m@th`  
661 `\global\@eqcnt\z@`  
662 `\tabskip\@centering`  
663 `\let\\\@eqnocr`  
664 `$$\arraycolsep\p@`  
665 `\everycr{}\halign to\displaywidth\bgroup`  
666 `\hskip\@centering$\displaystyle\tabskip\z@skip{##}$\@eqnrel`  
667 `&\global\@eqcnt\@ne\hskip\tw@arraycolsep\hfil$##$\hfil`  
668 `&\global\@eqcnt\tw@\hskip\tw@arraycolsep`  
669  `$\displaystyle{##}$\hfil\tabskip\@centering`  
670 `&\global\@eqcnt\thr@@\hb@xt@\z@\bgroup\hss##\egroup`  
671 `\tabskip\z@skip`  
672 `\cr`  
673 `}`

`\funding` The macro to print grants. It adds to the rpi file the information about grants  
674 `\newcommand\funding[3][ ]{%`  
675 `\protected@write\@mainrpi{%`  
676 `{\@percentchar sponsor=#2, grantid=#3}%`  
677 `\def\@tempa{#1}\relax%`  
678 `\ifx\@tempa\@empty\relax`  
679 `\def\@tempb{#3}%`  
680 `#2%`  
681 `\ifx\@tempb\@empty\relax\else\ (grant~#3)\fi`  
682 `\else`  
683 `#1`  
684 `\fi}`

### 3.16 End of Class

685 `\</class>`

## References

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## Change History

v0.10	General: Bibliography styles update . . . . . 2	Made remark theorem style identical to definition theorem style . . . . . 29
	Documentation update . . . . . 2	Made Roman font the default URL font . . . . . 14
	Screen mode triggers special URL settings . . . . . 14	<code>\@fullref</code> : Added macro . . . . . 30
	<code>\if@aom@screen@mode</code> : Added screen mode . . . . . 13	<code>\@setaddresses</code> : Deleted the word URL . . . . . 27
	<code>\jfm</code> : Added macro . . . . . 30	E-mail is now in Roman font . . 27
v0.2	General: First fully functional version . . . . . 2	<code>\@setpublishedonline</code> : Decreased font . . . . . 27
v0.3	General: Added DOI number in headers . . . . . 17	<code>\@typesizes</code> : Corrected typo in the definition of Small . . . . . 16
	Added package <code>mdputu</code> . . . . . 15	Increased LARGE from 16 pt to 17 pt . . . . . 16
	Documentation update . . . . . 2	<code>\bfullref</code> : Added macro . . . . . 31
	<code>\arxiv</code> : Added macro . . . . . 30	<code>\emailaddrname</code> : Changed macro . 27
	<code>\corresponding</code> : Added macro . . 23	<code>\eqfullref</code> : Added macro . . . . . 31
	<code>\doinumber</code> : Added macro . . . . . 23	<code>\fullref</code> : Added macro . . . . . 30
	<code>\EditorialComment</code> : Added macro . 30	<code>\pfullref</code> : Added macro . . . . . 31
	<code>\if@aom@manuscript@mode</code> : Added manuscript mode . . . . . 13	<code>proof</code> : Redefined macro . . . . . 29
	<code>\mr</code> : Added macro . . . . . 30	<code>\subsection</code> : Redefined macro . . 28
	<code>\mrnumber</code> : Added macro . . . . . 23	v0.6
	<code>\newtheorem</code> : Redefined macro . . 29	General: Changes to bst files . . . . 2
	<code>\proposed</code> : Added macro . . . . . 23	Fullref.pl is much less aggressive now . . . . . 2
	<code>\seconded</code> : Added macro . . . . . 23	<code>\@setauthors</code> : 'By' and 'and' are in Roman font now . . . . . 25
	<code>\version</code> : Added macro . . . . . 23	<code>\belowdisplayskip</code> : Changed belowdisplayskip . . . . . 16
	<code>\zbl</code> : Added macro . . . . . 30	<code>\bibliofont</code> : Changed default . . 30
	<code>\zblnumber</code> : Added macro . . . . . 23	<code>\zbl</code> : Changed capitalization . . . 30
v0.4	General: Changed definition theorem style . . . . . 29	v0.7
	Changed plain theorem style . . 29	General: Bibliography styles changed . . . . . 2
	Deleted <code>lineno</code> package dependence . . . . . 14	v0.8
	Deleted remark theorem style . . 29	General: Added <code>yhmath</code> . . . . . 15
	Documentation update . . . . . 2	Bibliography styles update . . . . 2
	Switched to upright digits in italics everywhere . . . . . 15	Changed authors in header . . . . 17
	Used line numbers for headings . 17	Documentation update . . . . . 2
	<code>\@aom@linecount</code> : Added macro . . 17	Switched to <code>cmtiup</code> . . . . . 15
	<code>\enddoc@text</code> : Deleted many dates. . . . . 27	<code>\specialdigits</code> : Redefined to <code>noop</code> . . . . . 15
v0.5	General: Added extra footer in manuscript mode . . . . . 17	v0.9
	Corrected the byg with math in headers . . . . . 17	General: Bibliography styles update . . . . . 2
		Changed font for the folio on the first page . . . . . 17
		Documentation update . . . . . 2
		<code>\@and</code> : Redefined macro . . . . . 27

<code>\@setaddresses</code> : Deleted spurious space in urladdress . . . . .	27	<code>\aom@write@paper@info</code> : Added macro . . . . .	24
<code>\@setpublishedonline</code> : Increased font . . . . .	27	v1.14a	
<code>abstract</code> : Added parindent for the first par . . . . .	23	<code>\annalsurl</code> : New url . . . . .	18
<code>\eqnarray</code> : Redefined standard macro . . . . .	31	v1.15	
v1.0		<code>\doi</code> : Doi according to the new Crossref recommendations . . .	30
General: Top matter macros are now only in preamble . . . . .	2	<code>\ifaom@doiMMXVI</code> : Added another options . . . . .	14
<code>\doinumber</code> : Added default . . . . .	23	v1.16	
<code>\papernumber</code> : Added macro . . . . .	22	General: We require environ package . . . . .	14
v1.1		<code>\aom@write@paper@info</code> : Added names, abstract, subjects, keywords, zblnumber, arxivnumber . . . . .	24
General: In manuscript mode the links are always blue . . . . .	14	Corrected the endpage bug . . . . .	24
v1.10		<code>\arxivnumber</code> : Added macro . . . . .	23
<code>\@and</code> : Added internationalization . . . . .	27	<code>\author</code> : Redefined amsart definition . . . . .	19
<code>\@aom@and</code> : Added macro . . . . .	15	<code>abstract</code> : Redefined using environ . . . . .	23
<code>\@aom@by</code> : Added macro . . . . .	15	<code>\email</code> : Redefined amsart definition . . . . .	20
<code>\@setauthors</code> : Internationalization . . . . .	25	<code>\fulladdress</code> : Redefined . . . . .	18
<code>\doi</code> : Introduced the logic for old doi formatting . . . . .	30	<code>\givenname</code> : Redefined . . . . .	18
<code>\ifaom@olddoi</code> : Added old DOI processing . . . . .	14	<code>\surname</code> : Redefined . . . . .	18
v1.11		<code>\urladdr</code> : Redefined amsart definition . . . . .	20
General: Added <code>\fulladdress</code> . . . . .	2	v1.17	
Added new commands for copyright statement . . . . .	2	General: Added new field totalpages to the bibliography . . . . .	2
Bibliography change: titlenote, deleted bysame . . . . .	2	v1.17a	
Deleted <code>\repeatedauthors</code> from the documentation . . . . .	2	General: Bug fixed in aomplain.bst . . . . .	2
<code>\adminfootnotes</code> : Added copyright statement . . . . .	26	v1.18	
<code>\@setaddresses</code> : Changed email handling . . . . .	27	General: New option <code>oldkeywords</code> and printing keywords and subjects by default . . . . .	2
<code>\bysame</code> : Made the macro obsolete . . . . .	30	<code>\@setaddresses</code> : Added orcid . . . . .	27
<code>\copyrightnote</code> : Added macro . . . . .	23	<code>\@setkeywords</code> : Now we print keywords . . . . .	26
<code>\copyrightyear</code> : Added macro . . . . .	23	<code>\@setsubjects</code> : Now we print subjects . . . . .	26
<code>\fulladdress</code> : Added macro . . . . .	18	<code>\ifaom@oldkeywords</code> : Added keywords processing . . . . .	14
<code>\repeatedauthors</code> : Now this command is obsolete . . . . .	30	<code>\orcid</code> : Added macro . . . . .	20
v1.12		<code>\subject</code> : Drop scheme and primary/secondary . . . . .	21
<code>\appendix</code> : Added hyperref definition . . . . .	28	v1.19	
v1.13		General: Bibliography changes . . . . .	2
<code>\Hy@AlphNoErr</code> : Added macro for older installations . . . . .	28	v1.2	
v1.14		General: Bibliography styles update . . . . .	2
<code>\@mainrpi</code> : Added macro . . . . .	24	<code>\@setaddresses</code> : Changed font for current address . . . . .	27
<code>\@maketitle@hook</code> : Added macro . . . . .	25		

<code>\arxiv</code> : Now we properly treat numbers with underscores ...	30	<code>\@processcurrentcontribgroup</code> : Introduced macro .....	19
<code>\doi</code> : Now we properly treat numbers with underscores ...	30	<code>\contrib</code> : Redefined amsart macro	20
<code>\jfm</code> : Now we properly treat numbers with underscores ...	30	<code>\contribs</code> : Introduced macro ...	19
<code>\mr</code> : Now we properly treat numbers with underscores ...	30	<code>\if@startcontribgroup</code> : Introduced macro .....	19
<code>\oldsubsections</code> : Introduced macro .....	28	v1.27	
<code>\subsection</code> : Decreased vertical spacing .....	28	<code>\aom@write@paper@info</code> : Keep the .rpi file open till the end of document .....	24
<code>\zbl</code> : Now we properly treat numbers with underscores ...	30	<code>\funding</code> : Added macro .....	31
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