LaTeX 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 AMSLaTeX 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 AMSLaTeX 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 uprgiht 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.

options
`draft`
`final`

The options `draft` and `final` work in the same way as for amsart and standard 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
`manuscript`

The option `manuscript` is intended to faciliate the communications between 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 mariginal commentaries in the manuscript
3. Hyperlinks are black in normal mode, but blue in manuscript mode.

option
`screen`

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

option
`olddoi`

Starting from version 1.9 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.

options
`8pt`
`9pt`
`10pt`
`11pt`
`12pt`

The size-changing options of amsart class (`8pt`, `9pt`, ..., `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).

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 descibed 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 between 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` `\email` `\address` `\curraddr` `\urladdr` The interface for specifying the authors and their affiliations is close the 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` and `\urladdr`. 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` `\surname` 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.

`\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 LaTeX), 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 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`.

\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
\revised
\accepted
\published
\publishedonline

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

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

\proposed
\seconded
\corresponding
\editor
\version

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

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

\volumenumber
\issuenumber
\publicationyear
\papernumber
\startpage
\endpage

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

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

Note that if the argument of \endpage is empty, LaTeX 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
\mrnumber
\zblnumber

The macros \doinumber, \mrnumber and \zblnumber set the information 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/). The use of these macros should be obvious:

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

Code	Example
`\widetilde{AB}`	$\widetilde{AB}$
`\widehat{AB}`	$\widehat{AB}$
`\widetriangle{AB}`	$\widetriangle{AB}$
`\wideparen{AB}`	$\wideparen{AB}$
`\widering{AB}`	$\widering{AB}$
`\widebar{AB}`	$\widebar{AB}$

Table 1: Wide Mathematical Accents

Note the difference between these commands and the bibliography commands discussed in Section 2.7. Commands in this Section set up the data for the *current article*. Commands in Section 2.7 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` `eqnarray*` Thee 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 avilable, are *not* recommended and should be avoided if possible.

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

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

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

`\fullref` `\pfullref` `\bfullref` `\eqfullref` 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

```
...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 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}`" and "`word~\ref{reference}`" to "`\fullref{word}{reference}`, and similarly for parenthesized references or `\eqref` commands. 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 LaTeX graphics possibilities).

2.7 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}
}
```

\doi
\mr
\zbl
\jfm
\arxiv

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

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.

```
⟨class⟩\NeedsTeXFormat{LaTeX2e}
⟨*gobble⟩
\ProvidesFile{aomart.dtx}
⟨/gobble⟩
⟨class⟩\ProvidesClass{aomart}
[2012/10/26 v1.13 Typesetting articles for the Annals of Mathematics]
```

And the driver code:

```
⟨*gobble⟩
\documentclass{ltxdoc}
\usepackage{array,booktabs,amsmath,graphics}
\let\widebar\overline
\usepackage{url}
\usepackage{amsfonts,yhmath}
\usepackage[breaklinks,colorlinks,linkcolor=black,citecolor=black,
            pagecolor=black,urlcolor=black,hyperindex=false]{hyperref}
\PageIndex
\CodelineIndex
\RecordChanges
\EnableCrossrefs
\begin{document}
  \DocInput{aomart.dtx}
\end{document}
⟨/gobble⟩
⟨*class⟩
```

3.2 Options

The size-changing options produce a warning:

```
\long\def\aom@size@warning#1{%
  \ClassWarning{aomart}{Size-changing option #1 will not be
    honored}}%
\DeclareOption{8pt}{\aom@size@warning{\CurrentOption}}%
\DeclareOption{9pt}{\aom@size@warning{\CurrentOption}}%
\DeclareOption{10pt}{\aom@size@warning{\CurrentOption}}%
\DeclareOption{11pt}{\aom@size@warning{\CurrentOption}}%
\DeclareOption{12pt}{\aom@size@warning{\CurrentOption}}%
```

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

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

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

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

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

```
\newif\if@aom@olddoi
\@aom@olddoifalse
\DeclareOption{olddoi}{\@aom@olddoitrue}
```

All other options are passed to amsart:

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

Now we read the configuration file

```
\InputIfFileExists{aomart.cfg}{%
  \ClassInfo{aomart}{%
    Loading configuration file aomart.cfg}}{%
  \ClassInfo{aomart}{%
    Configuration file aomart.cfg is not found}}
```

And process the options:

```
\ProcessOptions\relax
```

3.3 Loading Class and Packages

We start with the base class

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

A bunch of packages:

```
\RequirePackage{fancyhdr, lastpage, ifpdf}
\RequirePackage[breaklinks,colorlinks]{hyperref}
\if@aom@screen@mode
\hypersetup{linkcolor=blue,citecolor=blue,
  urlcolor=blue, pdfpagescrop={110 705 500 80}}%
\else\if@aom@manuscript@mode
\hypersetup{linkcolor=blue,citecolor=blue,
  urlcolor=blue}%
\else
\hypersetup{linkcolor=black,citecolor=black,
  urlcolor=black}%
\fi\fi
\urlstyle{rm}
```

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:

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

\@aom@and This is “and” in English:

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

Now we can define internationalization:

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

3.5 Fonts

We use yhmath for wide symbols:

```
\RequirePackage{yhmath}
```

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

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

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

```
\def\specialdigits{}%
\let\sishape=\itshape
\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 typesizes: 5 below and 5 above \normalsize .

```
\def\@typesizes{%
  \or{\@vipt}{9}\or{\@viipt}{9}\or{\@viiipt}{9}\or{\@ixpt}{12}%
  \or{\@xpt}{13}%
  \or{\@xipt}{14}% normalsize
  \or{\@xiipt}{15}\or{13}{17}\or{\@xviipt}{20}%
  \or{19}{23.2}\or{22}{27.8}}%
\normalsize \linespacing=\baselineskip
```

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

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

3.6 Page Dimensions and Paragraphing

\textwidth
\textheight

These are from the old aomamlt2e:

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

\evensidemargin
\oddsidemargin

The margins:

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

\footins
\topskip
\abovedisplayskip
\belowdisplayskip

Some skips from aomamlt2e:

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

\footskip

Some space for footnotes:

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

\parskip
\parindent

Paragraph shape:

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

\widowpenalty
\clubpenalty

We suppress widows and clubs:

```
\widowpenalty=10000
\clubpenalty=10000
```

3.7 Headers

\headsep

Separation between the header and the body

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

\headrulewidth
\footrulewidth

We do not want decorative rules in the journal:

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

\@aom@linecount

This is the box displayed in the manuscript mode

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

It is easy to set up headers with fancyhdr:

```
\pagestyle{fancy}
\fancyhead{}
\fancyfoot{}
\fancyhead[CO]{\scriptsize\shorttitle}
\fancyhead[RO,LE]{\footnotesize\thepage}
\if@aom@manuscript@mode
  \fancyhead[LE]{\footnotesize\thepage\begin{picture}(0,0)%
      \put(-26,-25){\usebox{\@aom@linecount}}%
    \end{picture}}
  \fancyhead[LO]{\begin{picture}(0,0)%
      \put(-21,-25){\usebox{\@aom@linecount}}%
    \end{picture}}
  \fancyfoot[C]{\scriptsize Proof: page numbers may be temporary}
\fi
\fancyhead[CE]{\scriptsize\MakeUppercase\shortauthors}
```

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

```
\fancypagestyle{firstpage}{%
  \fancyhf{}%
  \if@aom@manuscript@mode
    \lhead{\begin{picture}(0,0)%
        \put(-21,-25){\usebox{\@aom@linecount}}%
      \end{picture}}
  \fi
  \chead{\scriptsize%
    \href{\@annalsurl}{Annals of Mathematics} \textbf{\currentvolume}
    (\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.

```
    \start@page%
    \def\tempa{\pageref{LastPage}}%
    \edef\tempb{\start@page}%
    \ifx\tempa\end@page
      \edef\tempa{\HyPsd@@@pageref{LastPage}}%
    \else
       \edef\tempa{\end@page}%
    \fi
    \ifx\tempa\tempb\else--\end@page\fi\\
  \ifx\@doinumber\@empty\else
  \edef\@doinumber{\@doinumber}%
  \expandafter\doi\expandafter{\@doinumber}\fi}%
   \cfoot{\footnotesize\thepage}}%
```

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

```
\def\annalsurl#1{\gdef\@annalsurl{#1}}
\annalsurl{http://annals.math.princeton.edu/annals/about/cover/cover.html}
```

3.8 Top Matter Macros

We make these macros allowed only in the preamble:

```
\@onlypreamble{\title}
\@onlypreamble{\author}
\@onlypreamble{\email}
\@onlypreamble{\address}
\@onlypreamble{\curraddr}
\@onlypreamble{\urladdr}
\@onlypreamble{\givenname}
\@onlypreamble{\fulladdress}
\@onlypreamble{\surname}
\@onlypreamble{\thanks}
\@onlypreamble{\keyword}
\@onlypreamble{\subject}
\@onlypreamble{\received}
\@onlypreamble{\revised}
\@onlypreamble{\accepted}
\@onlypreamble{\published}
\@onlypreamble{\publishedonline}
\@onlypreamble{\proposed}
\@onlypreamble{\seconded}
\@onlypreamble{\corresponding}
\@onlypreamble{\editor}
\@onlypreamble{\version}
\@onlypreamble{\volumenumber}
\@onlypreamble{\issuenumber}
\@onlypreamble{\publicationyear}
\@onlypreamble{\copyrightnote}
\@onlypreamble{\copyrighyear}
\@onlypreamble{\papernumber}
\@onlypreamble{\startpage}
\@onlypreamble{\endpage}
\@onlypreamble{\doinumber}
\@onlypreamble{\mrnumber}
\@onlypreamble{\zblnumber}
```

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

\fulladdress These commands at present do nothing: they are for machine indexing only.
\givenname
\surname

```
\let\givenname=\@gobble
\let\surname=\@gobble
\let\fulladdress=\@gobble
```

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

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

\subject We do not typeset subject, but use it for PDF info.

```
\let\@subjects\@empty
\def\subject#1#2#3{\ifx\@subjects\@empty\gdef\@subjects{#1:#2:#3}\else
  \g@addto@macro\@subjects{, #1:#2:#3}\fi}
```

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

```
\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.

```
\def\@formatdate#1-#2-#3\@endformatdate{%
  \@tempcnta=#3\relax
  \ifcase#2\or
  January\or February\or March\or April\or May\or June\or
  July\or August\or September\or October\or November\or December\fi
  \space\the\@tempcnta,\space#1}
```

\received The following macros add stuff to the footnotes material:
\revised
\accepted
\published
\publishedonline

```
\def\received#1{\def\@received{#1}}
\let\@received\@empty
\def\revised#1{\def\@revised{#1}}
\let\@revised\@empty
\def\accepted#1{\def\@accepted{#1}}
\let\@accepted\@empty
\def\published#1{\def\@published{#1}}
\let\@published\@empty
\def\publishedonline#1{\def\@publishedonline{#1}}
\let\@publishedonline\@empty
```

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

\volumenumber This sets the volume of the paper

```
\def\volumenumber#1{\def\currentvolume{#1}}
```

\issuenumber This sets the issue of the paper:

```
\def\issuenumber#1{\def\currentissue{#1}}
```

\publicationyear This sets the year of the paper

```
\def\publicationyear#1{\def\currentyear{#1}}
```

\papernumber This is absent from the \issueinfo.

```
\def\papernumber#1{\def\currentpaper{#1}}
\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...

```
\def\startpage#1{\pagenumbering{arabic}\setcounter{page}{#1}%
  \def\start@page{#1}%
  \ifnum\c@page<\z@ \pagenumbering{roman}\setcounter{page}{-#1}%
    \def\start@page{\romannumeral#1}%
  \fi}
```

`\endpage` This macro again has a twist in it: if the argument is not set, it calculates the last page number itself.

```
\def\endpage#1{\def\@tempa{#1}%
  \ifx\@tempa\@empty\def\end@page{\pageref{LastPage}}%
  \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.

```
\def\pagespan#1#2{\startpage{#1}\endpage{#2}}
\pagespan{1}{}
```

`abstract` We slightly redefine abstract comparing to amsart conventions:

```
\renewenvironment{abstract}{%
  \ifx\maketitle\relax
    \ClassWarning{aomart}{Abstract should precede
      \protect\maketitle\space in AMS derived classes}%
  \fi
  \global\setbox\abstractbox=\vtop\bgroup%
    \vglue1pc%
    {\centering\normalfont\normalsize\bfseries\abstractname\par\vglue1pc}%
    \list{}{\labelwidth\z@%
      \leftmargin3pc \rightmargin\leftmargin%
      \listparindent\normalparindent \itemindent\normalparindent%
      \parsep\z@ \@plus\p@%
      \let\fullwidthdisplay\relax%
    }%
    \item[]\normalfont\Small%
}{%
  \endlist\egroup%
  \ifx\@setabstract\relax\@setabstracta\fi%
}

```

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

```
\let\proposed\@gobble
```

`\seconded` Or the seconder

```
\let\seconded\@gobble
```

\corresponding This is the corresponding author—again not typeset

```
\let\corresponding\@gobble
```

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

```
\let\version\@gobble
```

\doinumber Now databases' numbers of the article:

\mrnumber

\zblnumber

```
\def\doinumber#1{\gdef\@doinumber{#1}}
\doinumber{10.4007/annals.\currentyear.\currentvolume.\currentissue.\currentpaper}
\def\mrnumber#1{\gdef\@mrnumber{#1}}
\mrnumber{}
\def\zblnumber#1{\gdef\@zblnumber{#1}}
\zblnumber{}
```

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

```
\def\copyrightyear#1{\def\@copyrightyear{#1}}
\copyrightyear{}
```

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

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

3.9 Typesetting Top Matter

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

```
\def\@settitle{\begin{center}%
  \baselineskip20\p@\relax
    \bfseries\LARGE
  \@title
  \ifpdf
    \hypersetup{pdftitle=\@title}%
  \fi
  \end{center}%
}
```

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

```
\def\@setauthors{%
  \ifx\authors\@empty\relax\else
    \begingroup
    \def\thanks{\protect\thanks@warning}%
    \trivlist
    \centering\footnotesize \@topsep30\p@\relax
    \advance\@topsep by -\baselineskip
    \item\relax
    \def\@@and{{\upshape \@aom@and}}
```

```
    \author@andify\authors
    \ifpdf
      \hypersetup{pdfauthor=\authors}%
    \fi
    \def\\{\protect\linebreak}%
    \small \@aom@by{} \scshape\authors%
    \ifx\@empty\contribs
    \else
      ,\penalty-3 \space \@setcontribs
      \@closetoccontribs
    \fi
    \endtrivlist
    \endgroup
    \fi}
```

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

```
\def\@setcontribs{%
  \@xcontribs
  {\scshape \xcontribs}%
}
```

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

```
\def\@adminfootnotes{%
  \let\@makefnmark\relax  \let\@thefnmark\relax
  \ifx\@empty\@date\else \@footnotetext{\@setdate}\fi
  \ifx\@empty\@subjclass\else \@footnotetext{\@setsubjclass}\fi
  \ifx\@empty\@keywords\else\@setkeywords\fi
  \ifx\@empty\@subjects\else\@setsubjects\fi
  \ifx\@empty\thankses\else \@footnotetext{%
    \def\par{\let\par\@par}\@setthanks}%
  \fi
  \ifx\@empty\@copyrightnote\else \@footnotetext{%
    \def\par{\let\par\@par}\@copyrightnote\@addpunct.}%
  \fi
}
```

`\@setkeywords` We do not typeset keywords, but use them for the PDF information

```
\def\@setkeywords{%
    \ifpdf
      \hypersetup{pdfkeywords=\@keywords}%
    \fi
}
```

`\@setsubjects` We do not typeset subjects, but use them for the PDF information

```
\def\@setsubjects{%
    \ifpdf
      \hypersetup{pdfsubject=\@subjects}%
    \fi
}
```

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

```
\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.

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

\@setreceived A bunch of macros for setting centered dates
\@setrevised
\@setaccepted
\@setpublished
\@setpublishedonline

```
\def\@setreceived{{\centering(Received: \@received)\par}}
\def\@setrevised{{\centering(Revised: \@revised)\par}}
\def\@setaccepted{{\centering(Accepted: \@accepted)\par}}
\def\@setpublished{{\centering(Published: \@published)\par}}
\def\@setpublishedonline{{\centering(Published online: \@publishedonline)\par}}
```

\emailaddrname We do not want the word "address" here:

```
\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

```
\def\@setaddresses{\par
  \nobreak \begingroup
\footnotesize
  \def\author##1{\nobreak\addvspace\bigskipamount}%
  \def\\{\unskip, \ignorespaces}%
  \interlinepenalty\@M
  \def\address##1##2{\begingroup
    \par\addvspace\bigskipamount\indent
    \@ifnotempty{##1}{(\ignorespaces##1\unskip) }%
    {\scshape\ignorespaces##2}\par\endgroup}%
  \def\curraddr##1##2{\begingroup
    \@ifnotempty{##2}{\nobreak\indent\curraddrname
      \@ifnotempty{##1}{, \ignorespaces\scshape##1\unskip}\hskip0.2em:\space
      \scshape##2\par}\endgroup}%
  \def\email##1##2{\begingroup
    \@ifnotempty{##2}{\nobreak\indent\emailaddrname
      \@ifnotempty{##1}{, \ignorespaces##1\unskip}\hskip0.2em:\space
      \href{mailto:##2}{\nolinkurl{##2}}\par}\endgroup}%
  \def\urladdr##1##2{\begingroup
    \@ifnotempty{##2}{\nobreak\indent
      \@ifnotempty{##1}{, \ignorespaces##1\unskip}%
      \url{##2}\par}\endgroup}%
```

```
  \addresses
  \endgroup
}
```

3.11 Sectioning

`\contentsnamefont` This is the font for the word "Contents":

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

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

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

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

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

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

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

`\subsubsection` Subsubsections are formatted exactly like subsections:

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

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

```
\providecommand\Hy@AlphNoErr[1]{%
  \ifnum\value{#1}>26 %
    Alph\number\value{#1}%
  \else
    \ifnum\value{#1}<1 %
      Alph\number\value{#1}%
    \else
      \Alph{#1}%
    \fi
  \fi
}%
```

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

```
\def\appendix{\par\c@section\z@ \c@subsection\z@
  \gdef\theHsection{\Hy@AlphNoErr{section}}%
   \let\sectionname\appendixname
   \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:

```
\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.

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

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

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

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

```
\newtheoremstyle{remark}{0.5\linespacing}{0.5\linespacing}%
   {\upshape}{\parindent}%
   {\sishape}{.}{0.5em}%
   {\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.

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

proof We want our proofs to be indented:

```
\renewenvironment{proof}[1][\proofname]{\par
  \pushQED{\qed}%
  \normalfont \topsep6\p@\@plus6\p@\relax
  \trivlist
  \item[\hskip\labelsep\hskip\parindent
        \itshape
    #1\@addpunct{.}]\ignorespaces
}{%
  \popQED\endtrivlist\@endpefalse
}
```

3.14 Bibliography Macros

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

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

\bysame We no longer use \bysame

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

\doi Typesetting doi...

```
\def\doi#1{\if@aom@olddoi\href{http://dx.doi.org/#1}{doi: \path{#1}}%
\else\url{http://dx.doi.org/#1}\fi}
```

\mr \zbl \arxiv \jfm Typesetting urls

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

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

3.15 Additional Macros

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

```
\def\EditorialComment#1{\if@aom@manuscript@mode\bgroup
  \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.

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

`\fullref` A reference without parentheses:

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

`\pfullref` A reference with parentheses:

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

`\bfullref` A reference with brackets:

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

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

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

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

```
\def\eqnarray{%
   \stepcounter{equation}%
   \def\@currentlabel{\p@equation\theequation}%
   \global\@eqnswtrue
   \m@th
   \global\@eqcnt\z@
   \tabskip\@centering
   \let\\\@eqncr
   $$\arraycolsep1\p@
   \everycr{}\halign to\displaywidth\bgroup
       \hskip\@centering$\displaystyle\tabskip\z@skip{##}$\@eqnsel
      &\global\@eqcnt\@ne\hskip \tw@\arraycolsep \hfil${##}$\hfil
      &\global\@eqcnt\tw@ \hskip \tw@\arraycolsep
         $\displaystyle{##}$\hfil\tabskip\@centering
      &\global\@eqcnt\thr@@ \hb@xt@\z@\bgroup\hss##\egroup
         \tabskip\z@skip
      \cr
}
```

3.16 End of Class

⟨/class⟩

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