LaTeX Class for *Association for Computing Machinery*[*]

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Abstract

This package provides a class for typesetting publications of Association for Computing Machinery.

Contents

1 Introduction **3**

2 User's guide **3**
2.1 Installation . . . 3
2.2 Invocation and options . . . 5
2.3 Topmatter commands . . . 7
2.4 Algorithms . . . 15
2.5 Figures and tables . . . 16
2.6 Theorems . . . 17
2.7 Online-only and offline-only material . . . 17
2.8 Note about anonymous mode . . . 18
2.9 Acknowledgments . . . 18
2.10 Bibliography . . . 19
2.11 Colors . . . 21
2.12 Other notable packages and typographic remarks . . . 21

3 Implementation **23**
3.1 Identification . . . 23
3.2 Options . . . 23
3.3 Setting switches . . . 25
3.4 Loading base class and package . . . 26
3.5 Paper size and paragraphing . . . 32

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3.6 Fonts . . . 35
3.7 Floats . . . 36
3.8 Lists . . . 38
3.9 Top matter data . . . 38
3.10 Concepts system . . . 49
3.11 Copyright system . . . 50
3.12 Typesetting top matter . . . 54
3.13 Headers and Footers . . . 67
3.14 Sectioning . . . 71
3.15 TOC Lists . . . 73
3.16 Theorems . . . 73
3.17 Acknowledgments . . . 76
3.18 Conditional typesetting . . . 76
3.19 Additional bibliography commands . . . 76
3.20 End of Class . . . 77

1 Introduction

Association for Computing Machinery is the world's largest educational and scientific computing society, which delivers resources that advance computing as a science and a profession[1]. It was one of the early adopters of TEX for its typesetting.

It provided several different classes for a number of journal and conference proceedings. Unfortunately during the years since these classes were written, the code was patched many times, and the support of the different versions of the classes became difficult.

This package provides the uniform interface for all ACM publications. It is intended to replace all different classes and packages and provide an up to date LATEX package.

The package uses only free TEX packages and fonts included in TEXLive, MikTEX and other popular TEX distributions. It is intended to be published in these distributions itself, which minimizes users' efforts in the installation and support of the package.

I am grateful to Matthew Fluet, John Owens, Craig Rodkin, Bernard Rous, David Shamma, Stephen Spencer and many others for their invaluable help.

The development version of the package is available at https://github.com/borisveytsman/acmart.

2 User's guide

2.1 Installation

Most probably, you already have this package installed in your favorite TEX distribution; if not, you may want to upgrade. You may need to upgrade it anyway since the package uses a number of relatively recent packages, especially the ones related to the fonts.

If you decide to install the package yourself, follow the standard rules:

1. Run latex on `acmart.ins`. This will produce the file `acmart.cls`.
2. Put the file `acmart.cls` and the bibligoraphy files `*.bst` to the places where LATEX can find them (see [1] or the documentation for your TEX system).
3. Update the database of file names. Again, see [1] or the documentation for your TEX system for the system-specific details.
4. The file `acmart.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 a number of other packages. They are included in all major TEX distributions (TEXLive, MacTEX, MikTEX) of 2015 and later, so you probably have them installed. Just in case here is the list of these packages:

- *amscls*, http://www.ctan.org/pkg/amscls

[1] http://www.acm.org/

- *amsfonts*, http://www.ctan.org/pkg/amsfonts
- *amsmath*, http://www.ctan.org/pkg/amsmath
- *binhex*, http://www.ctan.org/pkg/binhex
- *caption*, http://www.ctan.org/pkg/caption
- *comment*, http://www.ctan.org/pkg/comment
- *environ*, http://www.ctan.org/pkg/environ
- *fancyhdr*, http://www.ctan.org/pkg/fancyhdr
- *float*, http://www.ctan.org/pkg/float
- *fontaxes*, http://www.ctan.org/pkg/fontaxes
- *geometry*, http://www.ctan.org/pkg/geometry
- *graphics*, http://www.ctan.org/pkg/graphics
- *hyperref*, http://www.ctan.org/pkg/hyperref
- *ifluatex*, http://www.ctan.org/pkg/ifluatex
- *ifxetex*, http://www.ctan.org/pkg/ifxetex
- *inconsolata*, http://www.ctan.org/pkg/inconsolata
- *latex-tools*, http://www.ctan.org/pkg/latex-tools
- *libertine*, http://www.ctan.org/pkg/libertine
- *manyfoot*, http://www.ctan.org/pkg/manyfoot
- *microtype*, http://www.ctan.org/pkg/microtype
- *ms*, http://www.ctan.org/pkg/ms
- *mweights*, http://www.ctan.org/pkg/mweights
- *natbib*, http://www.ctan.org/pkg/natbib
- *nccfoots*, http://www.ctan.org/pkg/nccfoots
- *newtx*, http://www.ctan.org/pkg/newtx
- *oberdiek*, http://www.ctan.org/pkg/oberdiek
- *pdftex-def*, http://www.ctan.org/pkg/pdftex-def
- *setspace*, http://www.ctan.org/pkg/setspace
- *totpages*, http://www.ctan.org/pkg/totpages

- *trimspaces*, http://www.ctan.org/pkg/trimspaces
- *upquote*, http://www.ctan.org/pkg/upquote
- *url*, http://www.ctan.org/pkg/url
- *xcolor*, http://www.ctan.org/pkg/xcolor
- *xkeyval*, http://www.ctan.org/pkg/xkeyval

2.2 Invocation and options

To use the class put in the preamble of your document

```
\documentclass[⟨options⟩]{acmart}
```

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

```
\documentclass[format=acmsmall, screen=true, review=false]{acmart}
```

The option `format` describes the format of the output. There are several possible values for this option, for example,

```
\documentclass[format=acmtog]{acmart}
```

Actually the words `format=` can be omitted, e.g.,

```
\documentclass[acmtog, review=false]{acmart}
```

The possible formats are listed in Table 1. Note that formats starting with `acm` are intended for journals and transactions, while formats starting with `sig` are intended for proceedings published as books.

There are several Boolean options which can take `true` or `false` values. They are listed in Table 2. The words `=true` can be omitted when setting the Boolean option, so instead of `screen=true` one can write just `screen`, for example,

```
\documentclass[acmsmall, screen, review]{acmart}
```

The option `review` is useful when combined with the `manuscript` format option: it provides a version suitable for reviewers and copyeditors.

The option `screen` may in the future involve additional features suitable for on-screen versions of the articles.

The option `natbib` is used when the corresponding BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.10.

The option `anonymous` is used for anonymous review process: all author information becomes obscured.

Table 1: The possible values for the `format` option

Value	Meaning
`manuscript`	A manuscript. This is the default
`acmsmall`	Small single column format, used for CIE, CSUR, JACM, JDIQ, JEA, JERIC, JETC, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TEAC, TECS, TIIS, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TRETS, TSAS, TSC, TSLP, TWEB.
`acmlarge`	Large single column format, used for IMWUT, JOCCH, PACMPL, TAP
`acmtog`	Large double column format, used for TOG
`sigconf`	Proceedings format for most of ACM conferences (with the exceptions listed below) and all ICPS volumes
`siggraph`	Proceedings format for SIGGRAPH and SIGGRAPH Asia conferences, published in ACM Transactions on Graphics journal issues
`sigplan`	Proceedings format for SIGPLAN conferences
`sigchi`	Proceedings format for SIGCHI conferences
`sigchi-a`	Format for SIGCHI extended abstract

Table 2: Boolean options

Option	Default	Meaning
`review`	`false`	A review version: lines are numbered, hyperlinks are colored
`screen`	`false`	A screen version: hyperlinks are colored
`natbib`	`true`	Whether to use `natbib` package (see Section 2.10)
`anonymous`	`false`	Whether to make author(s) anonymous
`authorversion`	`false`	Whether to generate a special version for authors' personal use or posting (see Section 2.3)

2.3 Topmatter commands

A number of commands set up *top matter* information, or, in the computer science jargon, *metadata* for the article. They establish the publication name, article title, authors, doi and other data. Some of these commands, like `\title` or `\author`, should be put by the authors. Others, like `\acmVolume` or `\acmDOI`—by the editors. Below we describe these commands and mention who should issue them. These macros should be used *before* the `\maketitle` command. Note that in the previous versions of ACM classes some of these commands should be used before `\maketitle`, and some after it. Now they all must be used before `\maketitle`.

The class internally loads `amsart` class, so many top matter commands are inherited from `amsart` [2].

`\acmJournal` The macro `\acmJournal{`⟨*shortName*⟩`}` sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication *in uppercase*, for example,

```
\acmJournal{TOMS}
```

The currently recognized journals are listed in Table 3. Note that conference proceedings published in *book* form do not set this macro.

It is expected that this command is inserted by the author of the manuscript when she decides to which journal to submit the manuscript.

`\acmConference` The macro `\acmConference[`⟨*short name*⟩`]{`⟨*name*⟩`}{`⟨*date*⟩`}{`⟨*venue*⟩`}` is used for conference proceedings published in the book form. The arguments are the following:

short name: the abbreviated name of the conference (optional).

name: the name of the conference *or* the name of the book as set by the editor.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

```
\acmConference[TD'15]{Technical Data Conference}{November
12--16}{Dallas, TX, USA}
\acmConference{SA'15 Art Papers}{November 02--06, 2015}{Kobe, Japan}
```

Normally this command is entered either by the editor or by the typesetter.

`\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.

It is expected that this command is inserted by the author of the manuscript.

Table 3: ACM publications and arguments of the `\acmJournal` command

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JDIQ	ACM Journal of Data and Information Quality
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
PACMPL	PACM on Programming Languages
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TIIS	ACM Transactions on Interactive Intelligent Systems
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

\subtitle

Besides title, ACM classes allow subtitle, set with the `\subtitle{⟨subtitle⟩}` macro.

The commands for specification of authors are highly structured. The reason is, they serve double duty: the authors' information is typeset in the manuscript, *and* is used by the metadata extraction tools for indexing and cataloguing. Therefore it is very important to follow the guidelines exactly.

\author
\orcid
\affiliation
\email

The basic commands are `\author`, `\orcid` (for the researchers registered with ORCID, http://www.orcid.org/), `\affiliation` and `\email`. In the simplest case you enter them in this order:

```
\author{...}
\orcid{...}
\affiliation{...}
\email{...}
```

Do *not* use LaTeX `\and` macro! Each author deserves his or her own `\author` command.

Note that some formats do not typset e-mails of ORCID identifiers. Do not worry: metadata tools will get them.

Sometimes an author has several affiliations. In this case the `\affiliation` command should be repeated:

```
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
```

Similarly you can repeat `\email` command.

You may have several authors with the same afifliation, different affiliations or overlapping affiliations (author A_1 is affiliated with institutions I_1 and I_2, while author A_2 is affiliated with I_2 only, and author A_3 is affiliated with I_1 and I_3, …). The recommended solution is to put the `\affiliation` commands after each author, possibly repeating them:

```
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
```

In some cases when several authors share the same affiliation you may try to save the space using the format

```
\author{...}
\email{...}
\author{...}
\email{...}
\affiliation{...}
```

However, this format is not generally recommended.

\position
\institution
\department
\streetaddress
\city
\state
\postcode
\country

The \affiliation command is further structured to interact with the metadata extraction tools. Inside the this command you should use \position, \institution, \department, \city, \streetaddress, \state, \postcode and \country macros to indicate the corresponding parts of the affiliation. Note that in some cases (for example, journals) these parts are not printed in the resulting copy, but they *are* necessary since they are used by the XML metadata extraction programs. Do *not* put commas or \\ between the elements of \affiliation: they will be provided automatically.

An example of the author block:

```
\author{A. U. Thor}
\orcid{1234-4564-1234-4565}
\affiliation{%
  \institution{University of New South Wales}
  \department{School of Biomedical Engineering}
  \streetaddress{Samuels Building (F25), Kensington Campus}
  \city{Sidney}
  \state{NSW}
  \postcode{2052}
  \country{Australia}}
\email{author@nsw.au.edu}
\author{A. N. Other}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
\author{C. O. Respondent}
\orcid{1234-4565-4564-1234}
\affiliation{%
  \institution{University of Pennsylvania}
  \city{Philadelphia}
  \state{PA}
  \country{USA}}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
```

Note that old ACM conference formats did not allow for more than six authors and required some efforts from the authors to achieve alignment. The new format is much better in this.

Sometimes an author works in several departments within the same insitution. There could be two situations: the departments are independent, or one department is within another. In the first case just repeat the command `\department` several times. To handle the second case the command has an optional numerical parameter. The departments with higher numbers are higher in the organizational chart. Compare

```
 \affiliation{%
\department[0]{Department of Lunar Studies} % 0 is the default
\department[1]{John Doe Institute} % higher than 0
\institution{University of San Serriffe}
\country{San Serriffe}}
```

and

```
 \affiliation{%
\department{Department of Lunar Studies} % Not within JD Inst!
\department{John Doe Institute}
\institution{University of San Serriffe}
\country{San Serriffe}}
```

It is expected that these commands are inserted by the author of the manuscript.

`\thanks` Like amsart (and unlike standard LaTeX), we allow `\thanks` only *outside* of commands `\title` and `\author`. Example:

```
\thanks{This work is supported by the Widget Corporation Grant
\#312-001.\\
Author's address: D. Pineo, Kingsbury Hall, 33 Academic Way, Durham,
N.H. 03824; email: dspineo@comcast.net; Colin Ware, Jere A. Chase
Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824; email:
cware@ccom.unh.edu;
Sean Fogarty, (Current address) NASA Ames Research Center, Moffett
Field, California 94035.}
```

It is expected that this command is inserted by the author of the manuscript.

`\titlenote` `\subtitlenote` `\authornote` While the command `\thanks` generates a note without footnote mark, sometimes the authors might need notes more tightly connected to the title, subtitle or author. The commands `\titlenote`, `\subtitlenote` and `\authornote` that follow the corresponding commands (`\title`, `\subtitle` and `\author`) generate such notes, for example

```
\title{This is a title}
\titlenote{This is a titlenote}
\author{A. U. Thor}
\authornote{This is an authornote}
```

\acmVolume
\acmNumber
\acmArticle
\acmYear
\acmMonth

The macros \acmVolume, \acmNumber, \acmArticle, \acmYear and \acmMonth are inserted by the editor and set the journal volume, issue, article number, year and month corrspondingly. The arguments of all these commands, including \acmMonth is numerical, including \acmMonth, for example,

```
\acmVolume{9}
\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
\acmMonth{3}
```

\acmArticleSeq

The articles in the same issue of a journal have a *sequential number*. It is used to vertically position the black blob in some formats. By default it is the same as article number, but the command \acmArticleSeq{⟨*n*⟩} can be used to change it:

```
\acmArticle{39}   % The sequence number will be 39 by default
\acmArticleSeq{5} % We redefine it to 5
```

\acmPrice

The macro \acmPrice{⟨*price*⟩} sets the price for the article (by default 15.00), for example,

```
\acmPrice{25.00}
```

\acmISBN

Book-like volumes have ISBN numbers attached to them. The macro \acmISBN{⟨*ISBN*⟩} sets it. Normally it is set by the typesetter, for example,

```
\acmISBN{978-1-4503-3916-2}
```

\acmDOI

The macro \acmDOI{⟨*DOI*⟩} sets the DOI number of the article, for example,

```
\acmDOI{10.1145/9999997.9999999}
```

It is normally set by the typesetter.

\acmBadgeR
\acmBadgeL

Some conference articles get special distinction, for example, the artifact evaluation for PPoPP 2016 (see http://ctuning.org/ae/ppopp2016.html). These articles display special badges supplied by the conference organizers. The class provides commands to add these badges: \acmBadgeR[⟨*url*⟩]{⟨*graphics*⟩} and \acmBadgeL[⟨*url*⟩]{⟨*graphics*⟩}. The first command puts the badge to the right of the title, and the second one—to the left. The exception is the sigchi-a mode for SIGCHI Extended abstract, which puts the badges on the left margin. The argument have the following meaning: [⟨*url*⟩], if provided, sets the link to the badge authority in the screen version, while {⟨*graphics*⟩} sets the graphics file with the badge image. The file must be a cropped square, which is scaled to a standard size in the output. For example, if the badge image is ae-logo.pdf, the command is

```
\acmBadgeR[http://ctuning.org/ae/ppopp2016.html]{ae-logo}
```

\startPage The macro \startPage{⟨*page*⟩} sets the first page of the article in the journal or book. It is used by the typesetter.

\terms \keywords The macros \terms{⟨*term, term,...*⟩} and \keywords{⟨*keyword, keyword,...*⟩} set the main terms and the additional keywords for the article. Term and keywords must be separated by commas, for example,

```
\terms{wireless, interference}
\keywords{wireless sensor networks, media access control,
multi-channel, radio interference, time synchronization}
```

CCSXML \ccsdesc ACM publications are classified according to the ACM Computing Classification Scheme (CCS). CCS codes are used both in the typeset version of the publications *and* in the metadata in the various databases. Therefore you need to provide both TEX commands and XML metadata with the paper.

The tool at http://dl.acm.org/ccs.cfm can be used to generate CCS codes. After you select the topics, click on "Generate CCS codes" to get the result like the following:

```
\begin{CCSXML}
<ccs2012>
 <concept>
  <concept_id>10010520.10010553.10010562</concept_id>
  <concept_desc>Computer systems organization~Embedded systems</concept_desc>
  <concept_significance>500</concept_significance>
 </concept>
 <concept>
  <concept_id>10010520.10010575.10010755</concept_id>
  <concept_desc>Computer systems organization~Redundancy</concept_desc>
  <concept_significance>300</concept_significance>
 </concept>
 <concept>
  <concept_id>10010520.10010553.10010554</concept_id>
  <concept_desc>Computer systems organization~Robotics</concept_desc>
  <concept_significance>100</concept_significance>
 </concept>
 <concept>
  <concept_id>10003033.10003083.10003095</concept_id>
  <concept_desc>Networks~Network reliability</concept_desc>
  <concept_significance>100</concept_significance>
 </concept>
</ccs2012>
\end{CCSXML}

\ccsdesc[500]{Computer systems organization~Embedded systems}
\ccsdesc[300]{Computer systems organization~Redundancy}
\ccsdesc{Computer systems organization~Robotics}
\ccsdesc[100]{Networks~Network reliability}
```

You need to just copy this code and paste it in your paper anywhere before \maketitle.

Table 4: Parameters for \setcopyright command

Parameter	Meaning
none	The copyright and permission information is not typeset (this is the option for some ACM conferences).
acmcopyright	The authors transfer the copyright to ACM (the "traditional" choice).
acmlicensed	The authors retain the copyright but license the publication rights to ACM.
rightsretained	The authors retain the copyright and publication rights to themselves or somebody else.
usgov	All the authors are employees of the US Government.
usgovmixed	Some authors are employees of the US Government.
cagov	All the authors are employees of the Canadian Government.
cagovmixed	Some authors are employees of the Canadian Government.

\setcopyright There are several possibilities for the copyright of the papers published by ACM: the authors may transfer the rights to ACM, license them to ACM, some or all authors might be employees of the US or Canada Government, etc. Accordingly the command \setcopyright{...} is introduced. Its argument is the copyright status of the paper, for example, \setcopyright{acmcopyright}. The possible values for this command are listed in Table 4.

The ACM submission software should generate the right command for you to paste into your file.

\copyrightyear Each copyright statement must have the year of copyright. By default it is the same as \acmYear, but you can override this decision using the macro \copyrightyear, e.g.,

```
\acmYear{2016}
\copyrightyear{2015}
```

There is a special case for a personal copy that the authors may be allowed to generate for their use or a posting on a personal site (check the instructions for the specific journal or conference for the details). The document option authorversion=true produces the special form of the copyright statement for this case. Note that you still need the \setcopyright command and (optionally) \copyrightyear command to tell TEX about the copyright owner and year. Also, you should be aware that due to the different sizes of the permssion blocks for the printed version and authors' version the page breaks might be different between them.

abstract The environment abstract must *precede* \maketitle command. Again, this is different from the standard LATEX.

teaserfigure A special kind of figure is used for many two-column conference proceedings. This figure is placed just after the authors, but before the main text. The environment teaserfigure is used for these figures. This environment must be used *before* \maketitle, for example,

Table 5: Settings for `\settopmatter` command

Parameter	Values	Meaning
printccs	true/false	Whether to print CCS categories
printacmref	true/false	Whether to print ACM bibliographic entry
printfolios	true/false	Whether to print page numbers (folios)

```
\begin{teaserfigure}
  \includegraphics[width=\textwidth]{sampleteaser}
  \caption{This is a teaser}
  \label{fig:teaser}
\end{teaserfigure}
```

`\settopmatter` Some information in the top matter is printed for certain journals or proceedings and suppressed for others. You may override these defaults using the command `\settopmatter{`⟨*settings*⟩`}`. The settings and their meanings are listed in Table 5. For example,

```
\settopmatter{printacmref=false, printccs=true, printfolios=true}
```

`\received` The command `\received[`⟨*stage*⟩`]{`⟨*date*⟩`}` sets the history of the publication. The `[`⟨*stage*⟩`]` argument is optional; the default is `Received` for the first date and `revised` for the subsequent ones. For example

```
\received{February 2007}
\received[revised]{March 2009}
\received[accepted]{June 2009}
```

`\maketitle` The macro `\maketitle` must be the last command in the top matter group: i.e., it must follow the commands defined in this section.

`\shortauthors` *After* the command `\maketitle` the macro `\shortauthors` stores the names of the authors for the running head. You may redefine it if the list of author's name is too long, e.g.,

```
\maketitle
\renewcommand{\shortauthors}{Zhou et al.}
```

2.4 Algorithms

There now several good packages for typesetting algorithms [3, 4, 5], and the authors are now free to choose their favorite one.

2.5 Figures and tables

New ACM styles use the standard LaTeX interface for figures and tables. There are some important items to be aware of, however.

1. The captions for figures must be entered *after* the figure bodies, and for the tables *before* the table bodies.

2. ACM uses the standard types for figures and types and adds several new ones. In total there are the following types:

   figure, table: a standard figure or table, taking full text width in one-column formats and one column in two-column formats.

   figure*, table* in two-column formats, a special figure or table taking full text width.

   teaserfigure: a special figure before `\maketitle`.

   sidebar, marginfigure, margintable: in the `sigchi-a` format, special sidebars, tables and figures on the margin.

3. Accordingly, when scaling the images, one should use the following sizes:

   (a) For `figure` in one-column mode, `figure*` in two-column mode or `teaserfigure`—`\textwidth` (in the one-column you can also use `\columnwidth`, which coincides with `\textwidth` in this case).

   (b) For `figure` in two-column mode—`\columnwidth`.

   (c) For `marginfigure`–`\marginparwidth`.

   (d) For `figure*` in SIGCHI Extended abstracts—`\fulltextwidth`.

It is strongly recommended to use the package booktabs [6] and follow its main principles of typography with respect to tables:

1. Never, ever use vertical rules.

2. Never use double rules.

It is also a good idea not to overuse horizontal rules.

For table *footnotes* you have several options described in TeX FAQ [1]. The simplest one is to use `\minipage` environment:

```
\begin{table}
\caption{Simulation Configuration}
\label{tab:conf}
\begin{minipage}{\columnwidth}
\begin{center}
\begin{tabular}{ll}
  \toprule
  TERRAIN\footnote{This is a table footnote. This is a
    table footnote. This is a table footnote.}   &
```

```
    (200\,m$\times$200\,m) Square\\
  Node Number     & 289\\
  Node Placement  & Uniform\\
  Application     & Many-to-Many/Gossip CBR Streams\\
  Payload Size    & 32 bytes\\
  Routing Layer   & GF\\
  MAC Layer       & CSMA/MMSN\\
  Radio Layer     & RADIO-ACCNOISE\\
  Radio Bandwidth & 250Kbps\\
  Radio Range     & 20m--45m\\
  \bottomrule
\end{tabular}
\end{center}
\bigskip
\footnotesize\emph{Source:} This is a table
 sourcenote. This is a table sourcenote. This is a table
 sourcenote.

 \emph{Note:} This is a table footnote.
\end{minipage}
\end{table}
```

sidebar
marginfigure
margintable

SIGCHI extended abstract extensively uses margin space. The package provides three environments for this with option captions:

sidebar: textual information on the margin

marginfigure: a figure on the margin

margintable: a table on the margin

Tables and figures (including margin tables and margin figures) are by default centered. However, in some cases (for example, when you use several subimages per figure) you may need to override this decision. A good way to do so is to put the contents into a `\minipage` of the width `\columnwidth`.

2.6 Theorems

ACM classes define two theorem styles and several pre-defined theorem environments:

acmplain: this is the style used for `theorem`, `conjecture`, `proposition`, `lemma`, `corollary`, and

acmdefinition: this is the style used for `example` and `definition`.

2.7 Online-only and offline-only material

printonly
screenonly

Some supplementary material in ACM publication is put online, but not in the printed

version. The text inside the environment screenonly will be typeset only when the option screen (see Section 2.2) is set to true. Conversely, the text inside the environment printonly is typset only when this option is set to false. For example

```
\section{Supplementary materials}

\begin{printonly}
  This section is included in the online version of the paper.
\end{printonly}

\begin{screenonly}
  (The actual section).
\end{screenonly}
```

We use *comment* package for typesetting this code, so \begin and \end should start at the first positions of the lines of their own (no initial spaces etc.).

2.8 Note about anonymous mode

anonsuppress

When the option anonymous is selected, TEX suppresses author information (including number of authors) for a blind review. However, sometimes the information identifying the authors may be present in the body of the paper

```
\begin{anonsuppress}
  This is the continuation of the previous work by the author
  \cite{prev1, prev2}.
\end{anonsuppress}
```

As for printonly and screenonly environments, \begin{anonsuppress} and \end{anonsuppress} should start the line of their own (no leading or trailing spaces).

2.9 Acknowledgments

The traditional "Acknowledgments" section is conventionally used to thank persons and granting agencies for their help and support. However, there are several important considerations about this section.

First, in the anonymous mode this section must be omitted: it gives too much information to the reviewers. Second, the data about the grants is extracted and stored separately by the postprocessing software. ACM classes provide facilities for both these tasks.

acks

The environment acks starts an unnumbered section "Acknowledgments" unless the anonymous mode is chosen. Put all thanks inside this environment.

As for printonly and screenonly environments, \begin{acks} and \end{acls} should start the line of their own (no leading or trailing spaces).

\grantsponsor
\grantnum

All the financial support *must* be listed using the commands \grantsponsor and \grantnum. These commands tell the postprocessing software about the granting organization and the grant. The format of the command is the following:

\grantsponsor{⟨*sponsorID*⟩}{⟨*name*⟩}{⟨*url*⟩}
\grantnum[⟨*url*⟩]{⟨*sponsorID*⟩}{⟨*number*⟩}.

Here {⟨*sponsorID*⟩} is the unique ID used to match grants to sponsors, {⟨*name*⟩} is the name of the sponsor, {⟨*url*⟩} is its URL, and {⟨*number*⟩} is the grant number. The {⟨*sponsorID*⟩} of the \grantnum command must correspond to \sponsorID of a \grantsponsor command. Some awards have their own web pages, which you can include using the optional argument of \grantnum command.

At present {⟨*sponsorID*⟩} is chosen by the authors and can be an arbitrary key, in the same way the label of \cite is arbitrarily chosen. There might be a change to this policy if ACM decides to create a global database of sponsoring organizations.

Example:

```
\begin{acks}
  The authors would like to thank Dr. Yuhua Li for providing the
  matlab code of  the \textit{BEPS} method.

  The authors would also like to thank the anonymous referees for
  their valuable comments and helpful suggestions. The work is
  supported by the \grantsponsor{GS501100001809}{National Natural
  Science Foundation of
  China}{http://dx.doi.org/10.13039/501100001809} under Grant
  No.:~\grantnum{GS501100001809}{61273304}
  and~\grantnum[http://www.nnsf.cn/youngscientsts]{GS501100001809}{Young
  Scientsts' Support Program}.
\end{acks}
```

2.10 Bibliography

ACM uses the *natbib* package for formatting references and the style ACM-Reference-Format.bst for BibTEX processing. You may disable loading of *natbib* by using the option natbib=false in \documentclass. However, it is not recommended, as well as the use of BibTEX styles other than ACM-Reference-Format.bst, and may delay the processing of the manuscript.

\citestyle If you use natbib, you can select one of two predefined sitation styles: the author-year format acmauthoryear or the numeric format acmnumeric using the command \citestyle, for example,

```
\citestyle{acmauthoryear}
```

Note that numeric citations are the default mode for most formats.

\setcitestyle You may further customize *natbib* using \setcitestyle command, for example,

```
\setcitestyle{numbers,sort&compress}
```

If you use natbib, then commands like \citep and \citeauthor are automatically supported. The command \shortcite is the same as \cite in numerical mode, and cites the year in the author-date mode.

There are several customized BibTeX entries and fields in ACM style `ACM-Reference-Format.bst` you may want to be aware of.

The style supports fields `doi` and `url`, for example,

```
doi = "10.1145/1188913.1188915",
url = "http://ccrma.stanford.edu/~jos/bayes/bayes.pdf",
```

The style supports arXiv recommended fields `eprint` and (optionally) `primaryclass`, for example,

```
eprint      = "960935712",
primaryclass = "cs",
```

See the examples at http://arxiv.org/hypertex/bibstyles/.

There are special entries `online` and `game` for Web pages and games, for example,

```
@online{Thornburg01,
 author = "Harry Thornburg",
 year =   "2001",
 title =  "Introduction to Bayesian Statistics",
 url =    "http://ccrma.stanford.edu/~jos/bayes/bayes.html",
 month =   mar,
 lastaccessed = "March 2, 2005",
}
```

For these entries you can use the `lastaccessed` field to add the access date to the URL.

There are two ways to enter video and audio sources in the bibliograpy corresponding to two different possibilies. For standalone sources available on WWW you can use an `online` entry, setting there `howpublished` field, for example,

```
@online{Obama08,
 author = "Barack Obama",
 year   = "2008",
 title  = "A more perfect union",
 howpublished  = "Video",
 day    = "5",
 url    = "http://video.google.com/videoplay?docid=6528042696351994555",
 month  = mar,
 lastaccessed = "March 21, 2008",
}
```

For the sources available as attachments to conference proceedings and similar documents, you can use the usual `inproceedings` entry, again setting the `howpublished` field:

```
@Inproceedings{Novak03,
 author =       "Dave Novak",
```

```
 title =        "Solder man",
 booktitle =    {ACM SIGGRAPH 2003 Video Review on Animation theater
                 Program},
 year =         "2003",
 publisher =   "ACM Press",
 address =   "New York, NY",
 pages =        "4",
 month =   "March 21, 2008",
 doi =   "99.9999/woot07-S422",
 howpublished = "Video"
}
```

Sometimes you need to cite a complete issue of a journal. The entry `periodical` is intended for this:

```
@periodical{JCohen96,
 key =   "Cohen",
 editor =       "Jacques Cohen",
 title =        "Special issue: Digital Libraries",
 journal =      CACM,
 volume =       "39",
 number =   "11",
 month =  nov,
 year =   "1996",
}
```

2.11 Colors

While printed ACM publications are usually black and white, screen mode allows the use of colors. The ACM classes pre-define several colors according to [7]: `ACMBlue`, `ACMYellow`, `ACMOrange`, `ACMRed`, `ACMLightBlue`, `ACMGreen`, `ACMPurple`, `ACMDarkBlue`. You can use them in the color assignments.

2.12 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

The package *subcaption* [8] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages *nomencl* [9] and *glossaries* [10] can be used for the automatic creation of the lists of symbols and concepts used.

By default `acmart` prevents all widows and orphans (i.e. lonely lines at the beginning and the end of the page) and hyphenation at the end of the page. This is done by rather strict settings

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

```
\brokenpenalty=10000
```

However, this may lead to frustrating results when the authors must obey a page limit. Setting these penalties to smaller values may help if you absolutely need to.

Another problem might be the too strict line breaking rules. Again, a strategically placed `\sloppy` command or putting the problematic paragraph inside `sloppypar` environment might help—but beware the results might be, well, sloppy.

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{acmart.dtx}
⟨/gobble⟩
⟨class⟩\ProvidesClass{acmart}
[2017/02/15 v1.30 Typesetting articles for Association of
Computing Machinery]
```

And the driver code:

```
⟨*gobble⟩
\documentclass{ltxdoc}
\usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx}
\usepackage[tt=false]{libertine}
\usepackage[varqu]{zi4}
\usepackage[libertine]{newtxmath}
\usepackage[tableposition=top]{caption}
\usepackage{hypdoc}
\PageIndex
\CodelineIndex
\RecordChanges
\EnableCrossrefs
\begin{document}
  \DocInput{acmart.dtx}
\end{document}
⟨/gobble⟩
⟨*class⟩
\def\@classname{acmart}
```

3.2 Options

We need `xkeyval` since some of our options may have values:

```
\RequirePackage{xkeyval}
```

`format` The possible formats

```
\define@choicekey*+{acmart.cls}{format}[\ACM@format\ACM@format@nr]{%
  manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
  sigplan, sigchi, sigchi-a}[manuscript]{}{%
  \ClassError{\@classname}{The option format must be manuscript,
    acmsmall, acmlarge, acmtog, sigconf, siggraph,
    sigplan, sigchi or sigchi-a}}
\def\@DeclareACMFormat#1{\DeclareOptionX{#1}{\setkeys{acmart.cls}{format=#1}}}
\@DeclareACMFormat{manuscript}
```

```
\@DeclareACMFormat{acmsmall}
\@DeclareACMFormat{acmlarge}
\@DeclareACMFormat{acmtog}
\@DeclareACMFormat{sigconf}
\@DeclareACMFormat{siggraph}
\@DeclareACMFormat{sigplan}
\@DeclareACMFormat{sigchi}
\@DeclareACMFormat{sigchi-a}
\ExecuteOptionsX{format}
```

`\if@ACM@screen` Whether we use screen mode

```
\define@boolkey+{acmart.cls}[@ACM@]{screen}[true]{%
  \if@ACM@screen
    \PackageInfo{\@classname}{Using screen mode}%
  \else
    \PackageInfo{\@classname}{Not using screen mode}%
  \fi}{\PackageError{\@classname}{Option screen can be either true or
    false}}
\ExecuteOptionsX{screen=false}
```

`\if@ACM@review` Whether we use review mode

```
\define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
  \if@ACM@review
    \PackageInfo{\@classname}{Using review mode}%
  \else
    \PackageInfo{\@classname}{Not using review mode}%
  \fi}{\PackageError{\@classname}{Option review can be either true or
    false}}
\ExecuteOptionsX{review=false}
```

`\if@ACM@authorversion` Whether we use author's version

```
\define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
  \if@ACM@authorversion
    \PackageInfo{\@classname}{Using authorversion mode}%
  \else
    \PackageInfo{\@classname}{Not using authorversion mode}%
  \fi}{\PackageError{\@classname}{Option authorversion can be either true or
    false}}
\ExecuteOptionsX{authorversion=false}
```

`\if@ACM@natbib@override` Whether to override the format decision about *natbib*

```
\newif\if@ACM@natbib@override
\@ACM@natbib@overridefalse
```

`\if@ACM@natbib` Whether we use natbib mode

```
\define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
  \@ACM@natbib@overridetrue
  \if@ACM@natbib
    \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
```

```
  \else
    \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
  \fi}{\PackageError{\@classname}{Option natbib can be either true or
    false}}
```

`\if@ACM@anonymous` Whether we use anonymous mode

```
\define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
  \if@ACM@anonymous
    \PackageInfo{\@classname}{Using anonymous mode}%
  \else
    \PackageInfo{\@classname}{Not using anonymous mode}%
  \fi}{\PackageError{\@classname}{Option anonymous can be either true or
    false}}
\ExecuteOptionsX{anonymous=false}
```

`\ACM@fontsize` The font size to pass to the base class

```
\def\ACM@fontsize{}
\DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

\DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
\DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
\ProcessOptionsX
\ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}
```

3.3 Setting switches

`\if@ACM@manuscript` Whether we use manuscript mode

```
\newif\if@ACM@manuscript
```

`\if@ACM@journal` There are two kinds of publications: journals and books

```
\newif\if@ACM@journal
```

`\if@ACM@sigchiamode` The formatting of SIGCHI abstracts is quite unusual. We have a special switch for them.

```
\newif\if@ACM@sigchiamode
```

Setting up switches

```
\ifnum\ACM@format@nr=0\relax
  \@ACM@manuscripttrue
\else
  \@ACM@manuscriptfalse
\fi
\@ACM@sigchiamodefalse
\ifcase\ACM@format@nr
\relax % manuscript
  \@ACM@journaltrue
```

```
\or % acmsmall
  \@ACM@journaltrue
\or % acmlarge
  \@ACM@journaltrue
\or % acmtog
  \@ACM@journaltrue
\or % sigconf
  \@ACM@journalfalse
\or % siggraph
  \@ACM@journalfalse
 \or % sigplan
  \@ACM@journalfalse
 \or % sigchi
  \@ACM@journalfalse
\or % sigchi-a
  \@ACM@journalfalse
  \@ACM@sigchiamodetrue
\fi
```

A format sets up `\if@ACM@natbib` only if `\@ACM@natbib@override` is false (i.e. user did *not* overrode format's selection):

```
\if@ACM@natbib@override\else
    \@ACM@natbibtrue
\fi
```

3.4 Loading base class and package

At this point we either have `\ACM@fontsize`, or use defaults

```
\ifx\ACM@fontsize\@empty
  \ifcase\ACM@format@nr
  \relax % manuscript
    \def\ACM@fontsize{9pt}%
  \or % acmsmall
    \def\ACM@fontsize{10pt}%
  \or % acmlarge
    \def\ACM@fontsize{10pt}%
  \or % acmtog
    \def\ACM@fontsize{9pt}%
  \or % sigconf
    \def\ACM@fontsize{9pt}%
  \or % siggraph
    \def\ACM@fontsize{9pt}%
   \or % sigplan
    \def\ACM@fontsize{9pt}%
   \or % sigchi
    \def\ACM@fontsize{10pt}%
  \or % sigchi-a
    \def\ACM@fontsize{10pt}%
  \fi
\fi
```

```
\ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
\LoadClass[\ACM@fontsize, reqno]{amsart}
\RequirePackage{microtype}
```

We need totpages package to calculate the number of pages

```
\RequirePackage{totpages}
```

The amsmath \collect@body is defined using \def. We load environ to access the \long version of the command

```
\RequirePackage{environ}
```

We use setspace for doublespacing

```
\if@ACM@manuscript
\RequirePackage{setspace}
\onehalfspacing
\fi
```

Citations. We patch \setcitestyle to allow, e.g., \setcitestyle{sort} and \setcitestyle{nosort}. We patch \citestyle to warn about undefined citation styles.

```
\if@ACM@natbib
  \RequirePackage{natbib}
  \renewcommand{\bibsection}{%
     \section*{\refname}%
     \phantomsection\addcontentsline{toc}{section}{\refname}%
  }
  \renewcommand{\bibfont}{\bibliofont}
  \renewcommand\setcitestyle[1]{
  \@for\@tempa:=#1\do
  {\def\@tempb{round}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{(}\renewcommand\NAT@close{)}\fi
   \def\@tempb{square}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{[}\renewcommand\NAT@close{]}\fi
   \def\@tempb{angle}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
   \def\@tempb{curly}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
   \def\@tempb{semicolon}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{;}\fi
   \def\@tempb{colon}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{;}\fi
   \def\@tempb{comma}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{,}\fi
   \def\@tempb{authoryear}\ifx\@tempa\@tempb
     \NAT@numbersfalse\fi
   \def\@tempb{numbers}\ifx\@tempa\@tempb
     \NAT@numberstrue\NAT@superfalse\fi
   \def\@tempb{super}\ifx\@tempa\@tempb
     \NAT@numberstrue\NAT@supertrue\fi
   \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
     \let\bibstyle=\@gobble\fi
```

```
  \def\@tempb{bibstyle}\ifx\@tempa\@tempb
    \let\bibstyle=\@citestyle\fi
  \def\@tempb{sort}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\fi
  \def\@tempb{nosort}\ifx\@tempa\@tempb
    \def\NAT@sort{\z@}\fi
  \def\@tempb{compress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\@ne}\fi
  \def\@tempb{nocompress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\@z}\fi
  \def\@tempb{sort&compress}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
  \def\@tempb{mcite}\ifx\@tempa\@tempb
    \let\NAT@merge\@ne\fi
  \def\@tempb{merge}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}{}\fi
  \def\@tempb{elide}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\thr@@}{\let\NAT@merge\thr@@}{}\fi
  \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
    \NAT@longnamestrue\fi
  \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
    \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
  \expandafter\NAT@find@eq\@tempa=\relax\@nil
  \if\@tempc\relax\else
    \expandafter\NAT@rem@eq\@tempc
    \def\@tempb{open}\ifx\@tempa\@tempb
     \xdef\NAT@open{\@tempc}\fi
    \def\@tempb{close}\ifx\@tempa\@tempb
     \xdef\NAT@close{\@tempc}\fi
    \def\@tempb{aysep}\ifx\@tempa\@tempb
     \xdef\NAT@aysep{\@tempc}\fi
    \def\@tempb{yysep}\ifx\@tempa\@tempb
     \xdef\NAT@yrsep{\@tempc}\fi
    \def\@tempb{notesep}\ifx\@tempa\@tempb
     \xdef\NAT@cmt{\@tempc}\fi
    \def\@tempb{citesep}\ifx\@tempa\@tempb
     \xdef\NAT@sep{\@tempc}\fi
  \fi
 }%
 \NAT@@setcites
 }
 \renewcommand\citestyle[1]{%
   \ifcsname bibstyle@#1\endcsname%
   \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
   \else%
   \@latex@error{Undefined `#1' citestyle}%
   \fi
 }%
\fi
```

\bibstyle@acmauthoryear The default author-year format:

```
\newcommand{\bibstyle@acmauthoryear}{%
  \setcitestyle{%
    authoryear,%
    open={(},close={)},citesep={;},%
    aysep={},yysep={,},%
    notesep={, }}}
```

\bibstyle@acmnumeric The default numeric format:

```
\newcommand{\bibstyle@acmnumeric}{%
  \setcitestyle{%
    numbers,sort&compress,%
    open={[},close={]},citesep={,},%
    notesep={, }}}
```

The default is numeric:

```
\if@ACM@natbib
\citestyle{acmnumeric}
\fi
```

Before we call hyperref, we redefine \startsection commands to their LaTeX defaults, since amsart ones are too AMS-specific. We need to do this early since we want hyperref to have a chance to redefine them again:

```
\def\@startsection#1#2#3#4#5#6{%
  \if@noskipsec \leavevmode \fi
  \par
  \@tempskipa #4\relax
  \@afterindenttrue
  \ifdim \@tempskipa <\z@
    \@tempskipa -\@tempskipa \@afterindentfalse
  \fi
  \if@nobreak
    \everypar{}%
  \else
    \addpenalty\@secpenalty\addvspace\@tempskipa
  \fi
  \@ifstar
    {\@ssect{#3}{#4}{#5}{#6}}%
    {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}}
\def\@sect#1#2#3#4#5#6[#7]#8{%
  \ifnum #2>\c@secnumdepth
    \let\@svsec\@empty
  \else
    \refstepcounter{#1}%
    \protected@edef\@svsec{\@seccntformat{#1}\relax}%
  \fi
  \@tempskipa #5\relax
  \ifdim \@tempskipa>\z@
    \begingroup
      #6{%
```

```
        \@hangfrom{\hskip #3\relax\@svsec}%
          \interlinepenalty \@M #8\@@par}%
    \endgroup
    \csname #1mark\endcsname{#7}%
    \addcontentsline{toc}{#1}{%
      \ifnum #2>\c@secnumdepth \else
        \protect\numberline{\csname the#1\endcsname}%
      \fi
      #7}%
  \else
    \def\@svsechd{%
      #6{\hskip #3\relax
      \@svsec #8}%
      \csname #1mark\endcsname{#7}%
      \addcontentsline{toc}{#1}{%
        \ifnum #2>\c@secnumdepth \else
          \protect\numberline{\csname the#1\endcsname}%
        \fi
        #7}}%
  \fi
  \@xsect{#5}}
\def\@xsect#1{%
  \@tempskipa #1\relax
  \ifdim \@tempskipa>\z@
    \par \nobreak
    \vskip \@tempskipa
    \@afterheading
  \else
    \@nobreakfalse
    \global\@noskipsectrue
    \everypar{%
      \if@noskipsec
        \global\@noskipsecfalse
       {\setbox\z@\lastbox}%
        \clubpenalty\@M
        \begingroup \@svsechd \endgroup
        \unskip
        \@tempskipa #1\relax
        \hskip -\@tempskipa
      \else
        \clubpenalty \@clubpenalty
        \everypar{}%
      \fi}%
  \fi
  \ignorespaces}
\def\@seccntformat#1{\csname the#1\endcsname\quad}
\def\@ssect#1#2#3#4#5{%
  \@tempskipa #3\relax
  \ifdim \@tempskipa>\z@
    \begingroup
```

```
      #4{%
        \@hangfrom{\hskip #1}%
          \interlinepenalty \@M #5\@@par}%
    \endgroup
  \else
    \def\@svsechd{#4{\hskip #1\relax #5}}%
  \fi
  \@xsect{#3}}
```

And hyperref

```
\let\@footnotemark@nolink\@footnotemark
\let\@footnotetext@nolink\@footnotetext
\RequirePackage[bookmarksnumbered,unicode]{hyperref}
\pdfstringdefDisableCommands{%
  \def\unskip{}%
  \def\textbullet{- }%
  \def\textrightarrow{ -> }%
  \def\footnotemark{}%
}
\urlstyle{rm}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \urlstyle{sf}
\or % sigchi
\or % sigchi-a
  \urlstyle{sf}
\fi
\if@ACM@screen
  \hypersetup{colorlinks,
    linkcolor=ACMRed,
    citecolor=ACMPurple,
    urlcolor=ACMDarkBlue,
    filecolor=ACMDarkBlue}
\else
  \hypersetup{hidelinks}
\fi
```

Bibliography mangling.

```
\if@ACM@natbib
  \let\citeN\cite
  \let\cite\citep
  \let\citeANP\citeauthor
  \let\citeNN\citeyearpar
  \let\citeyearNP\citeyear
  \let\citeyear\citeyearpar
```

```
  \let\citeNP\citealt
  \DeclareRobustCommand\citeA
     {\begingroup\NAT@swafalse
       \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
  \providecommand\newblock{}%
\else
  \providecommand\citename[1]{#1}
\fi
\def\shortcite#1{\ifNAT@numbers\cite{#1}\else\citeyear{#1}\fi}
```

`\bibliographystyle` Amsart redefines `\bibliographystyle` since it prefers AMS bibliography. We turn it back to LaTeX definition:

```
\def\bibliographystyle#1{%
  \ifx\@begindocumenthook\@undefined\else
    \expandafter\AtBeginDocument
  \fi
    {\if@filesw
       \immediate\write\@auxout{\string\bibstyle{#1}}%
     \fi}}
```

Graphics and color

```
\RequirePackage{graphicx, xcolor}
```

We define ACM colors according to [7]:

```
\definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
\definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
\definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
\definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
\definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
\definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
\definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
\definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}
```

3.5 Paper size and paragraphing

We use `geometry` for dimensions. Note the presently margins do not depend on the font size option - maybe we will need to change this. See https://github.com/borisveytsman/acmart/issues/5#issuecomment-272881329.

```
\RequirePackage{geometry}
\ifcase\ACM@format@nr
\relax % manuscript
   \geometry{letterpaper,head=13pt}%
\or % acmsmall
   \geometry{twoside=true,
     includeheadfoot, head=13pt, foot=2pc,
     paperwidth=6.75in, paperheight=10in,
     top=58pt, bottom=44pt, inner=46pt, outer=46pt
   }%
\or % acmlarge
```

```
  \geometry{twoside=true, head=13pt, foot=2pc,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot,
    top=78pt, bottom=114pt, inner=81pt, outer=81pt
    }%
\or % acmtog
  \geometry{twoside=true, head=13pt, foot=2pc,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=24pt,
    top=52pt, bottom=75pt, inner=52pt, outer=52pt
    }%
\or % sigconf
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=57pt, bottom=73pt, inner=54pt, outer=54pt
    }%
\or % siggraph
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=57pt, bottom=73pt, inner=54pt, outer=54pt
    }%
\or % sigplan
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot=false, columnsep=2pc,
    top=1in, bottom=1in, inner=0.75in, outer=0.75in
    }%
\or % sigchi
  \geometry{twoside=true, head=13pt,
    paperwidth=8.5in, paperheight=11in,
    includeheadfoot, columnsep=2pc,
    top=66pt, bottom=73pt, inner=54pt, outer=54pt
    }%
\or % sigchi-a
  \geometry{twoside=false, head=13pt,
    paperwidth=11in, paperheight=8.5in,
    includeheadfoot, marginparsep=72pt,
    marginparwidth=170pt, columnsep=20pt,
    top=72pt, bottom=72pt, left=314pt, right=72pt
    }%
    \@mparswitchfalse
    \reversemarginpar
\fi
```

\parindent
\parskip

Paragraphing

```
\setlength\parindent{10\p@}
\setlength\parskip{\z@}
\ifcase\ACM@format@nr
```

```
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
  \setlength\parindent{9\p@}%
\or % sigconf
\or % siggraph
\or % sigplan
\or % sigchi
\or % sigchi-a
\fi
```

Footnotes require some consideration. We have several layers of footnotes: frontmatter footnotes, "regular" footnotes and the special insert for bibstrip. In the old ACM classes bibstrip was a `\@float`. The problem with floats is that they tend to, well, float—and we want the guarantee they stay.

We use *manyfoot* for layered footnotes instead.

`\copyrightpermissionfootnoterule` This is the footnote rule that separates bibstrip from the rest of the paper. It is a full width rule.

```
\def\copyrightpermissionfootnoterule{\kern-3\p@
  \hrule \@width \columnwidth \kern 2.6\p@}

\RequirePackage{manyfoot}
\SelectFootnoteRule[2]{copyrightpermission}
\DeclareNewFootnote{copyrightpermission}
```

`\footnoterule` Tschichold's rules:

```
\def\footnoterule{\kern-3\p@
  \hrule \@width 4pc \kern 2.6\p@}
```

`\endminipage` We do not use footnote rules in minipages

```
\def\endminipage{%
    \par
    \unskip
    \ifvoid\@mpfootins\else
      \vskip\skip\@mpfootins
      \normalcolor
      \unvbox\@mpfootins
    \fi
    \@minipagefalse   %% added 24 May 89
  \color@endgroup
  \egroup
  \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
```

`\@makefntext` We do note use indentation for footnotes

```
\def\@makefntext{\noindent\@makefnmark}
```

\@footnotetext In sigchi-a mode our footnotes are on the margins!

```
\if@ACM@sigchiamode
\long\def\@footnotetext#1{\marginpar{%
    \reset@font\small
    \interlinepenalty\interfootnotelinepenalty
    \protected@edef\@currentlabel{%
       \csname p@footnote\endcsname\@thefnmark
    }%
    \color@begingroup
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}%
\fi
```

\@mpfootnotetext We want the footnotes in minipages centered:

```
\long\def\@mpfootnotetext#1{%
  \global\setbox\@mpfootins\vbox{%
    \unvbox\@mpfootins
    \reset@font\footnotesize
    \hsize\columnwidth
    \@parboxrestore
    \protected@edef\@currentlabel
         {\csname p@mpfootnote\endcsname\@thefnmark}%
    \color@begingroup\centering
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}
```

\@makefnmark AMS classes use a buggy definition of \makefnmark. We revert to the standard one.

```
\def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}
```

3.6 Fonts

\if@ACM@newfonts Whether we load the new fonts

```
\newif\if@ACM@newfonts
\@ACM@newfontstrue
\IfFileExists{libertine.sty}{}{\ClassWarning{\@classname}{You do not
    have libertine package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
\IfFileExists{zi4.sty}{}{\ClassWarning{\@classname}{You do not
   have zi4 package installed.  Please upgrade your TeX}\@ACM@newfontsfalse}
\IfFileExists{newtxmath.sty}{}{\ClassWarning{\@classname}{You do not
    have newtxmath package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
```

We use Libertine throughout.

```
\if@ACM@newfonts
\RequirePackage[tt=false]{libertine}
\RequirePackage[varqu]{zi4}
```

```
\RequirePackage[libertine]{newtxmath}
\RequirePackage[T1]{fontenc}
\fi
```

The SIGCHI extended abstracts are sans serif:

```
\if@ACM@sigchiamode
  \renewcommand{\familydefault}{\sfdefault}
\fi
```

3.7 Floats

We use caption package

```
\RequirePackage{caption, float}
\captionsetup[table]{position=top}
\if@ACM@journal
  \captionsetup{labelfont={sf, small},
    textfont={sf, small},  margin=\z@}
  \captionsetup[figure]{name={Fig.}}
\else
  \captionsetup{labelfont={bf},
    textfont={bf}, labelsep=colon, margin=\z@}
  \ifcase\ACM@format@nr
  \relax % manuscript
  \or % acmsmall
  \or % acmlarge
  \or % acmtog
  \or % sigconf
  \or % siggraph
    \captionsetup{textfont={it}}
  \or % sigplan
    \captionsetup{labelfont={bf},
      textfont={normalfont}, labelsep=period, margin=\z@}
  \or % sigchi
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
  \or % sigchi-a
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
  \fi
\fi
```

`sidebar` The sidebar environment:

```
\newfloat{sidebar}{}{sbar}
\floatname{sidebar}{Sidebar}
\renewenvironment{sidebar}{\Collect@Body\@sidebar}{}
```

`\@sidebar` The processing of the saved text

```
\long\def\@sidebar#1{\bgroup\captionsetup{type=sidebar}%
  \marginpar{\small#1}\egroup}
```

marginfigure The marginfigure environment:

```
\newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}
```

\@marginfigure The processing of the saved text

```
\long\def\@marginfigure#1{\bgroup\captionsetup{type=figure}%
  \marginpar{\centering\small#1}\egroup}
```

margintable The margintable environment:

```
\newenvironment{margintable}{\Collect@Body\@margintable}{}
```

\@margintable The processing of the saved text

```
\long\def\@margintable#1{\bgroup\captionsetup{type=table}%
  \marginpar{\centering\small#1}\egroup}
```

SIGCHI extended abstract provides an interesting possibility to push into the margin. Here we use `figure*` and `table*` for this.

\fulltextwidth We define the width of the boxes as

```
\newdimen\fulltextwidth
\fulltextwidth=\dimexpr(\textwidth+\marginparwidth+\marginparsep)
```

\@dblfloat We redefine the double float command. First, we make the size bigger. Second, our default position is going to be `tp` (to give marginalia a chance)

```
\if@ACM@sigchiamode
\def\@dblfloat{\bgroup\columnwidth=\fulltextwidth
  \let\@endfloatbox\@endwidefloatbox
  \def\@fpsadddefault{\def\@fps{tp}}%
  \@float}
\fi
```

\end@dblfloat And the end. Just adding a `\bgroup`.

```
\if@ACM@sigchiamode
\def\end@dblfloat{%
    \end@float\egroup}
\fi
```

\@endwidefloatbox This is the end of a wide box - we basically move everything to the left

```
\def\@endwidefloatbox{%
  \par\vskip\z@skip
  \@minipagefalse
  \outer@nobreak
  \egroup
  \color@endbox
  \global\setbox\@currbox=\vbox{\moveleft
    \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
  \wd\@currbox=\textwidth
}
```

3.8 Lists

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
\def\labelenumi{\theenumi.}
\def\labelenumii{\theenumii.}
\def\labelenumiii{\theenumiii.}
\def\labelenumiv{\theenumiv.}
\or % sigchi
\or % sigchi-a
\fi
```

`\descriptionlabel` We do not use default colon as `\amsart` does:

```
\renewcommand{\descriptionlabel}[1]{\hspace\labelsep \upshape\bfseries #1}
```

`\description` AMS uses additional indent of 6pt. Frank recommends dropping it.

```
\renewenvironment{description}{\list{}{%
    \itemindent-12\p@
    \labelwidth\z@ \let\makelabel\descriptionlabel}%
}{
  \endlist
}
\let\enddescription=\endlist % for efficiency
```

3.9 Top matter data

We use keyval interface to define journal title and relevant information

```
\define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
  CIE,%
  CSUR,%
  IMWUT,%
  JACM,%
  JDIQ,%
  JEA,%
  JERIC,%
  JETC,%
  JOCCH,%
  PACMPL,%
  TAAS,%
  TACCESS,%
  TACO,%
  TALG,%
  TALLIP,%
  TAP,%
```

```
  TCPS,%
  TEAC,%
  TECS,%
  TIIS,%
  TISSEC,%
  TIST,%
  TKDD,%
  TMIS,%
  TOCE,%
  TOCHI,%
  TOCL,%
  TOCS,%
  TOCT,%
  TODAES,%
  TODS,%
  TOG,%
  TOIS,%
  TOIT,%
  TOMACS,%
  TOMM,%
  TOMPECS,%
  TOMS,%
  TOPC,%
  TOPS,%
  TOPLAS,%
  TOS,%
  TOSEM,%
  TOSN,%
  TRETS,%
  TSAS,%
  TSC,%
  TSLP,%
  TWEB%
}{%
\ifcase\@journalCode@nr
\relax % CIE
  \def\@journalName{ACM Computers in Entertainment}%
  \def\@journalNameShort{ACM Comput. Entertain.}%
  \def\@permissionCodeOne{1544-3574}%
\or % CSUR
  \def\@journalName{ACM Computing Surveys}%
  \def\@journalNameShort{ACM Comput. Surv.}%
  \def\@permissionCodeOne{0360-0300}%
\or % IMWUT
  \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
    Wearable and Ubiquitous Technologies}%
  \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
  \def\@permissionCodeOne{2474-9567}%
\or % JACM
  \def\@journalName{Journal of the ACM}%
```

```
  \def\@journalNameShort{J. ACM}%
  \def\@permissionCodeOne{0004-5411}%
\or % JDIQ
  \def\@journalName{ACM Journal of Data and Information Quality}%
  \def\@journalNameShort{ACM J. Data Inform. Quality}%
  \def\@permissionCodeOne{1936-1955}%
\or % JEA
  \def\@journalName{ACM Journal of Experimental Algorithmics}%
  \def\@journalNameShort{ACM J. Exp. Algor.}%
  \def\@permissionCodeOne{1084-6654}%
\or % JERIC
  \def\@journalName{ACM Journal of Educational Resources in Computing}%
  \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
  \def\@permissionCodeOne{1073-0516}%
\or % JETC
  \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
  \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
  \def\@permissionCodeOne{1550-4832}%
\or % JOCCH
  \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
  \def\@journalName{ACM J. Comput. Cult. Herit.}%
\or % PACMPL
  \def\@journalName{Proceedings of the ACM on Programming Languages}%
  \def\@journalName{Proc. ACM Program. Lang.}%
  \def\@permissionCodeOne{2475-1421}%
\or % TAAS
  \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
  \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
  \def\@permissionCodeOne{1556-4665}%
\or % TACCESS
  \def\@journalName{ACM Transactions on Accessible Computing}%
  \def\@journalNameShort{ACM Trans. Access. Comput.}%
  \def\@permissionCodeOne{1936-7228}%
\or % TACO
  \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
\or % TALG
  \def\@journalName{ACM Transactions on Algorithms}%
  \def\@journalNameShort{ACM Trans. Algor.}%
  \def\@permissionCodeOne{1549-6325}%
\or % TALLIP
  \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
  \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
  \def\@permissionCodeOne{2375-4699}%
\or % TAP
  \def\@journalName{ACM Transactions on Applied Perception}%
\or % TCPS
  \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
\or % TEAC
  \def\@journalName{ACM Transactions on Economics and Computation}%
\or % TECS
```

```
  \def\@journalName{ACM Transactions on Embedded Computing Systems}%
  \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
  \def\@permissionCodeOne{1539-9087}%
\or % TIIS
  \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
  \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
  \def\@permissionCodeOne{2160-6455}%
\or % TISSEC
  \def\@journalName{ACM Transactions on Information and System Security}%
  \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
  \def\@permissionCodeOne{1094-9224}%
\or % TIST
  \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
  \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
  \def\@permissionCodeOne{2157-6904}%
\or % TKDD
  \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
  \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
  \def\@permissionCodeOne{1556-4681}%
\or % TMIS
  \def\@journalName{ACM Transactions on Management Information Systems}%
  \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
  \def\@permissionCodeOne{2158-656X}%
\or % TOCE
  \def\@journalName{ACM Transactions on Computing Education}%
  \def\@journalNameShort{ACM Trans. Comput. Educ.}%
  \def\@permissionCodeOne{1946-6226}%
\or % TOCHI
  \def\@journalName{ACM Transactions on Computer-Human Interaction}%
  \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
  \def\@permissionCodeOne{1073-0516}%
\or % TOCL
  \def\@journalName{ACM Transactions on Computational Logic}%
  \def\@journalNameShort{ACM Trans. Comput. Logic}%
  \def\@permissionCodeOne{1529-3785}%
\or % TOCS
  \def\@journalName{ACM Transactions on Computer Systems}%
  \def\@journalNameShort{ACM Trans. Comput. Syst.}%
  \def\@permissionCodeOne{0734-2071}%
\or % TOCT
  \def\@journalName{ACM Transactions on Computation Theory}%
  \def\@journalNameShort{ACM Trans. Comput. Theory}%
  \def\@permissionCodeOne{1942-3454}%
\or % TODAES
  \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
  \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
  \def\@permissionCodeOne{1084-4309}%
\or % TODS
  \def\@journalName{ACM Transactions on Database Systems}%
  \def\@journalNameShort{ACM Trans. Datab. Syst.}%
```

```
  \def\@permissionCodeOne{0362-5915}%
\or % TOG
  \def\@journalName{ACM Transactions on Graphics}%
  \def\@journalNameShort{ACM Trans. Graph.}%
  \def\@permissionCodeOne{0730-0301}
\or % TOIS
  \def\@journalName{ACM Transactions on Information Systems}%
  \def\@journalName{ACM Transactions on Information Systems}%
  \def\@permissionCodeOne{1046-8188}%
\or % TOIT
  \def\@journalName{ACM Transactions on Internet Technology}%
  \def\@journalNameShort{ACM Trans. Internet Technol.}%
  \def\@permissionCodeOne{1533-5399}%
\or % TOMACS
  \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
  \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
  \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
\or % TOMM
 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
  \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
  \def\@permissionCodeOne{1551-6857}%
  \def\@permissionCodeTwo{0100}%
\or % TOMPECS
 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
  \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
  \def\@permissionCodeOne{2376-3639}%
\or % TOMS
  \def\@journalName{ACM Transactions on Mathematical Software}%
  \def\@journalNameShort{ACM Trans. Math. Softw.}%
  \def\@permissionCodeOne{0098-3500}%
\or % TOPC
  \def\@journalName{ACM Transactions on Parallel Computing}%
  \def\@journalNameShort{ACM Trans. Parallel Comput.}%
  \def\@permissionCodeOne{1539-9087}%
\or % TOPS
  \def\@journalName{ACM Transactions on Privacy and Security}%
  \def\@journalNameShort{ACM Trans. Priv. Sec.}%
  \def\@permissionCodeOne{2471-2566}%
\or % TOPLAS
  \def\@journalName{ACM Transactions on Programming Languages and Systems}%
  \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
  \def\@permissionCodeOne{0164-0925}%
\or % TOS
  \def\@journalName{ACM Transactions on Storage}%
  \def\@journalNameShort{ACM Trans. Storage}%
  \def\@permissionCodeOne{1553-3077}%
\or % TOSEM
 \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
  \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
  \def\@permissionCodeOne{1049-331X}%
```

```
\or % TOSN
  \def\@journalName{ACM Transactions on Sensor Networks}%
  \def\@journalNameShort{ACM Trans. Sensor Netw.}%
  \def\@permissionCodeOne{1550-4859}%
\or % TRETS
  \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
  \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
  \def\@permissionCodeOne{1936-7406}%
\or % TSAS
  \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
  \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
  \def\@permissionCodeOne{2374-0353}%
\or % TSC
  \def\@journalName{ACM Transactions on Social Computing}%
  \def\@journalNameShort{ACM Trans. Soc. Comput.}%
  \def\@permissionCodeOne{2469-7818}%
\or % TSLP
  \def\@journalName{ACM Transactions on Speech and Language Processing}%
  \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
  \def\@permissionCodeOne{1550-4875}%
\or % TWEB
  \def\@journalName{ACM Transactions on the Web}%
  \def\@journalNameShort{ACM Trans. Web}%
  \def\@permissionCodeOne{1559-1131}%
\fi
\ClassInfo{\@classname}{Using journal code \@journalCode}%
}{%
  \ClassError{\@classname}{Incorrect journal #1}%
}%
```

`\acmJournal` And the syntactic sugar around it

```
\def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}}
```

The defaults:

```
\def\@journalCode@nr{0}
\def\@journalName{}%
\def\@journalNameShort{\@journalName}%
\def\@permissionCodeOne{XXXX-XXXX}%
\def\@permissionCodeTwo{}%
```

`\acmConference` This is the conference command

```
\newcommand\acmConference[4][]{%
  \gdef\acmConference@shortname{#1}%
  \gdef\acmConference@name{#2}%
  \gdef\acmConference@date{#3}%
  \gdef\acmConference@venue{#4}%
  \ifx\acmConference@shortname\@empty
    \gdef\acmConference@shortname{#2}%
  \fi}
```

```
\acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
  DC, USA}
```

`\subtitle` The subtitle macro

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

`\num@authorgroups` The total number of "groups". Each group is several authors with the same affiliations(s)

```
\newcount\num@authorgroups
\num@authorgroups=0\relax
```

`\if@insideauthorgroup` Whether we are continuing an author group @insideauthorgroup insideauthorgroup-false

`\author` Adding an author to the list of authors and addresses

```
\renewcommand\author[2][]{%
  \if@insideauthorgroup\else
    \global\advance\num@authorgroups by 1\relax
    \global\@insideauthorgrouptrue
  \fi
  \ifx\addresses\@empty
    \if@ACM@anonymous
      \gdef\addresses{\@author{Anonymous Author(s)}}%
      \gdef\authors{Anonymous Author(s)}%
    \else
      \gdef\addresses{\@author{#2}}%
      \gdef\authors{#2}%
    \fi
  \else
    \if@ACM@anonymous\else
      \g@addto@macro\addresses{\and\@author{#2}}%
      \g@addto@macro\authors{\and#2}%
    \fi
  \fi
  \if@ACM@anonymous
    \ifx\shortauthors\@empty
      \gdef\shortauthors{Anon.}%
    \fi
  \else
    \def\@tempa{#1}%
    \ifx\@tempa\@empty
      \ifx\shortauthors\@empty
        \gdef\shortauthors{#2}%
      \else
        \g@addto@macro\shortauthors{\and#2}%
      \fi
    \else
      \ifx\shortauthors\@empty
        \gdef\shortauthors{#1}%
```

```
      \else
        \g@addto@macro\shortauthors{\and#1}%
      \fi
    \fi
  \fi}
```

`\affiliation` The macro `\affiliation` mimics `\address` from `amsart`. Note that it has an optional argument we do not currently need, but keep for the possible future use.

```
\newcommand{\affiliation}[2][]{%
  \global\@insideauthorgroupfalse
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\affiliation{#1}{#2}}%
  \fi}
```

`\email` The macro `\email` mimics `\email` from `amsart`. Agian it has an optional argument we do not currently need, but keep for the possible future use.

```
\renewcommand{\email}[2][]{%
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\email{#1}{#2}}%
  \fi}
```

`\orcid` Right now we do not typeset orcids gobble

`\@titlenotes` The titlenotes

```
\def\@titlenotes{}
```

`\titlenote` Adding note to the title

```
\def\titlenote#1{%
  \g@addto@macro\@title{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@titlenotes{%
      \stepcounter{footnote}\footnotetext{Title note}}%
  \else
    \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

`\@subtitlenotes` The subtitlenotes

```
\def\@subtitlenotes{}
```

`\subtitlenote` Adding note to the subtitle

```
\def\subtitlenote#1{%
  \g@addto@macro\@subtitle{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{Subtitle note}}%
  \else
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

`\@authornotes` The authornotes

```
\def\@authornotes{}
```

`\authornote` Adding note to the author

```
\def\authornote#1{%
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\@authornotemark}
    \g@addto@macro\@authornotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

`\acmVolume` The current volume

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

`\acmNumber` The current number

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

`\acmArticle` The current article

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

`\acmArticleSeq` The sequence number

```
\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
\acmArticleSeq{\@acmArticle}
```

`\acmYear` The current year

```
\def\acmYear#1{\def\@acmYear{#1}}
\acmYear{2017}
```

`\acmMonth` The current month

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

`\@acmPubDate` The publication date

```
\def\@acmPubDate{\ifcase\@acmMonth\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~\@acmYear}
```

`\acmPrice` The price

```
\def\acmPrice#1{\def\@acmPrice{#1}}
\acmPrice{15.00}
```

`\acmISBN` The book isbn

```
\def\acmISBN#1{\def\@acmISBN{#1}}
\acmISBN{978-x-xxxx-xxxx-x/YY/MM}
```

`\acmDOI` The paper doi

```
\def\acmDOI#1{\def\@acmDOI{#1}}
\acmDOI{10.1145/nnnnnnn.nnnnnnn}
```

`\if@ACM@badge` Whether to print badge. Note that either left or right badge triggers it:

```
\newif\if@ACM@badge
\@ACM@badgefalse
```

`\@ACM@badge@width` The width of the badge

```
\newlength\@ACM@badge@width
\setlength\@ACM@badge@width{5pc}
```

`\@ACM@title@width` The width of the badge

```
\newlength\@ACM@title@width
```

`\@ACM@badge@skip` The space between the badge and the title

```
\newlength\@ACM@badge@skip
\setlength\@ACM@badge@skip{1pc}
```

`\acmBadgeR` Setting the right badge

```
\newcommand\acmBadgeR[2][]{\@ACM@badgetrue
  \def\@acmBadgeR@url{#1}%
  \def\@acmBadgeR@image{#2}}
\def\@acmBadgeR@url{}
\def\@acmBadgeR@image{}
```

`\acmBadgeL` Setting the left badge

```
\newcommand\acmBadgeL[2][]{\@ACM@badgetrue
  \def\@acmBadgeL@url{#1}%
  \def\@acmBadgeL@image{#2}}
\def\@acmBadgeL@url{}
\def\@acmBadgeL@image{}
```

`\startPage` The start page of the paper

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

`\terms` Terms are mostly obsolete, we use CCS now. Still it makes sense to keep them for compatibility.

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

`\keywords` Keywords are mostly obsolete, we use CCS now. Still it makes sense to keep them for compatibility.

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

abstract Amsart puts abstract in the box. Since we do not know whether we will use two column mode, we prefer to save the text

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

\@saveabstract And saving the abstract

```
\long\def\@saveabstract#1{\long\gdef\@abstract{#1}}
\@saveabstract{}
```

\@lempty The long version of \@empty (to compare with \@abstract)

```
\long\def\@lempty{}
```

\if@ACM@printccs Whether to print CCS

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
  \if@ACM@printccs
    \ClassInfo{\@classname}{Printing CCS}%
  \else
    \ClassInfo{\@classname}{Suppressing CCS}%
  \fi}{\ClassError{\@classname}{printccs must be true or false}}
```

\if@ACM@printacmref Whether to print ACM bib

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
  \if@ACM@printacmref
    \ClassInfo{\@classname}{Printing bibformat}%
  \else
    \ClassInfo{\@classname}{Suppressing bibformat}%
  \fi}{\ClassError{\@classname}{printacmref must be true or false}}
```

\if@ACM@printfolios Whether to print folios

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
  \if@ACM@printfolios
    \ClassInfo{\@classname}{Printing folios}%
  \else
    \ClassInfo{\@classname}{Suppressing folios}%
  \fi}{\ClassError{\@classname}{printfolios must be true or false}}
```

\settopmatter The usual syntactic sugar

```
\def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
```

Now the settings

```
\settopmatter{printccs=true, printacmref=true}
\if@ACM@manuscript
  \settopmatter{printfolios=true}
\else
  \if@ACM@journal
    \settopmatter{printfolios=true}
  \else
    \settopmatter{printfolios=false}
  \fi
\fi
```

\@received The container for the paper history

```
\def\@received{}
```

\received The \received command

```
\newcommand\received[2][]{\def\@tempa{#1}%
  \ifx\@tempa\@empty
    \ifx\@received\@empty
      \gdef\@received{Received #2}%
    \else
      \g@addto@macro{\@received}{; revised #2}%
    \fi
  \else
    \ifx\@received\@empty
      \gdef\@received{#1 #2}%
    \else
      \g@addto@macro{\@received}{; #1 #2}%
    \fi
  \fi}
\AtEndDocument{%
  \ifx\@received\@empty\else
    \par\bigskip\noindent\small\normalfont\@received\par
  \fi}
```

3.10 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```
\RequirePackage{comment}
\excludecomment{CCSXML}
```

\@concepts This is the storage macro for concepts

```
\let\@concepts\@empty
```

\ccsdesc The first argument is the significance, the second is the concept(s)

```
\newcommand\ccsdesc[2][100]{%
  \ccsdesc@parse#1~#2~}
```

\ccsdesc@parse The parser of the expression Significance~General~Specific (we need textcomp for \\textrightarrow:

```
\RequirePackage{textcomp}
\def\ccsdesc@parse#1~#2~#3~{%
  \expandafter\ifx\csname CCS@#2\endcsname\relax
   \expandafter\gdef\csname CCS@#2\endcsname{\textbullet\ \textbf{#2} \textrightarrow\ }%
  \g@addto@macro{\@concepts}{\csname CCS@#2\endcsname}\fi
  \expandafter\g@addto@macro\expandafter{\csname CCS@#2\endcsname}{%
    \ifnum#1>499\textbf{#3}; \else
    \ifnum#1>299\textit{#3}; \else
    #3; \fi\fi}}
```

3.11 Copyright system

This is from acmcopyright.sty

\if@printcopyright A flag whether to print copyright symbol

```
\newif\if@printcopyright
\@printcopyrighttrue
```

\if@printpermission Whether to print permission block

```
\newif\if@printpermission
\@printpermissiontrue
```

\if@acmowned Whether ACM ownes the rights to the paper

```
\newif\if@acmowned
\@acmownedtrue
```

Keys:

```
\define@choicekey*{ACM@}{acmcopyrightmode}[%
  \acm@copyrightinput\acm@copyrightmode]{none,acmcopyright,acmlicensed,%
  rightsretained,usgov,usgovmixed,cagov,cagovmixed,%
  licensedusgovmixed,licensedcagovmixed,othergov,licensedothergov}{%
  \@printpermissiontrue
  \@printcopyrighttrue
  \@acmownedtrue
  \ifnum\acm@copyrightmode=0\relax % none
   \@printpermissionfalse
   \@printcopyrightfalse
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=2\relax % acmlicensed
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=3\relax % rightsretained
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=4\relax % usgov
   \@printpermissiontrue
   \@printcopyrightfalse
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=6\relax % cagov
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=9\relax % licensedcagovmixed
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=10\relax % othergov
```

```
  \@acmownedtrue
 \fi
 \ifnum\acm@copyrightmode=11\relax % licensedothergov
  \@acmownedfalse
 \fi}
```

`\setcopyright` This is the syntactic sugar around setting keys.

```
\def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
\setcopyright{acmcopyright}
```

`\@copyrightowner` Here is the owner of the copyright

```
\def\@copyrightowner{%
 \ifcase\acm@copyrightmode\relax % none
 \or % acmcopyright
 ACM\@.
 \or % acmlicensed
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \or % rightsretained
 Copyright held by the owner/author(s).
 \or % usgov
 \or % usgovmixed
 ACM\@.
 \or % cagov
 Crown in Right of Canada.
 \or %cagovmixed
 ACM\@.
 \or %licensedusgovmixed
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \or %licensedcagovmixed
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \or % othergov
 ACM\@.
 \or % licensedothergov
 Copyright held by the owner/author(s). Publication rights licensed to
 ACM\@.
 \fi}
```

`\@formatdoi` Print a clickable doi

```
\def\@formatdoi#1{\url{http://dx.doi.org/#1}}
```

`\@copyrightpermission` The canned permission block.

```
\def\@copyrightpermission{%
 \ifcase\acm@copyrightmode\relax % none
 \or % acmcopyright
  Permission to make digital or hard copies of all or part of this
  work for personal or classroom use is granted without fee provided
```

```
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 this article, or to allow others to do so, for Government purposes
 only.
\fi}
```

\copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:

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

\@teaserfigures The teaser figures container

```
\def\@teaserfigures{}
```

teaserfigure The teaser figure

```
\newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}
```

\@saveteaser Saving the teaser

```
\long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}
```

\thanks We redefine amsart \thanks, so the anonymous key works

```
\renewcommand{\thanks}[1]{%
  \@ifnotempty{#1}{%
    \if@ACM@anonymous
      \g@addto@macro\thankses{\thanks{A note}}%
   \else
    \g@addto@macro\thankses{\thanks{#1}}%
   \fi}}
```

3.12 Typesetting top matter

\mktitle@bx Some of our formats use two column design, some use one column one. In all cases we use wide title. Thus we typeset the top matter in a special box to be use in the construction \@twocolumn[⟨*box*⟩].

```
\newbox\mktitle@bx
```

\maketitle The (in)famous \maketitle. Note that in sigchi-a mode authors are *not* in the title box.

Another note: there is a subtle difference between author notes, title notes and thankses. The latter refer to the paper itself, and therefore belong to the copyright/permission block. By the way, this was the default behavior of the old ACM classes.

```
\def\maketitle{%
  \if@ACM@anonymous
    % Anonymize omission of \author-s
    \ifnum\num@authorgroups=0\author{}\fi
  \fi
  \begingroup
  \let\@footnotemark\@footnotemark@nolink
  \let\@footnotetext\@footnotetext@nolink
  \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
  \@topnum\z@ % this prevents figures from falling at the top of page
              % 1
  \hsize=\textwidth
  \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
  \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
  \@printtopmatter
```

```
\if@ACM@sigchiamode\@mkauthors\fi
\setcounter{footnote}{0}%
\def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
\@titlenotes
\@subtitlenotes
\@authornotes
\let\@makefnmark\relax  \let\@thefnmark\relax
\let\@makefntext\noindent
\ifx\@empty\thankses\else
  \footnotetextcopyrightpermission{%
    \def\par{\let\par\@par}\parindent\z@\@setthanks}%
\fi
\footnotetextcopyrightpermission{\parindent\z@\parskip0.1\baselineskip
\if@ACM@authorversion\else
  \if@printpermission\@copyrightpermission\par\fi
\fi
\if@ACM@manuscript\else
  \if@ACM@journal\else % Print the conference short name
    {\itshape \acmConference@shortname, \acmConference@venue}\par
  \fi
\fi
\if@printcopyright
  \copyright\ \@copyrightyear\ \@copyrightowner\
\else
  \@copyrightyear.\
\fi
\if@ACM@manuscript
  Manuscript submitted to ACM\\
\else
  \if@ACM@authorversion
      This is the author's version of the work. It is posted here for
      your personal use. Not for redistribution. The definitive Version
      of Record was published in
      \if@ACM@journal
        \emph{\@journalName}%
      \else
        \emph{Proceedings of \acmConference@name, \acmConference@date}%
      \fi
      \ifx\@acmDOI\@empty
      .
      \else
        , \@formatdoi{\@acmDOI}.
      \fi\\
    \else
      \if@ACM@journal
        \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle\
        \$\@acmPrice\\
        DOI: \nolinkurl{\@acmDOI}%
      \else % Conference
         \@acmISBN
```

```
          \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\\
          DOI: \nolinkurl{\@acmDOI}%
       \fi
     \fi
   \fi}%
 \endgroup
 \setcounter{footnote}{0}%
 \@mkabstract
 \if@ACM@printccs
   \ifx\@concepts\@empty\else\bgroup
     {\@specialsection{CCS Concepts}%
        \@concepts\par}\egroup
    \fi
  \fi
  \if\@terms\@empty\else\bgroup
     {\@specialsection{General Terms}%
        \@terms\par}\egroup
  \fi
  \ifx\@keywords\@empty\else\bgroup
     {\if@ACM@journal
        \@specialsection{Additional Key Words and Phrases}%
      \else
        \@specialsection{Keywords}%
      \fi
        \@keywords}\par\egroup
  \fi
 \andify\authors
 \andify\shortauthors
 \global\let\authors=\authors
 \global\let\shortauthors=\shortauthors
 \if@ACM@printacmref
    \@mkbibcitation
 \fi
 \hypersetup{pdfauthor={\authors},
   pdftitle={\@title}, pdfkeywords={\@concepts}}%
 \@printendtopmatter
 \@afterindentfalse
 \@afterheading
}
```

`\@specialsection` This macro starts section for proceedings and uses small for journals

```
\def\@specialsection#1{%
 \ifcase\ACM@format@nr
 \relax % manuscript
   \par\medskip\small\noindent#1: %
 \or % acmsmall
   \par\medskip\small\noindent#1: %
 \or % acmlarge
   \par\medskip\small\noindent#1: %
 \or % acmtog
```

```
    \par\medskip\small\noindent#1: %
  \or % sigconf
    \section*{#1}%
  \or % siggraph
    \section*{#1}%
  \or % sigplan
    \paragraph*{#1}%
  \or % sigchi
    \section*{#1}%
  \or % sigchi-a
    \section*{#1}%
  \fi}
```

\@printtopmatter The printing of top matter starts the new page, and uses the given title box. Note that for sigchi-a we print badges here rather than in \mktitle since we want them on the margins.

```
\def\@printtopmatter{%
  \ifx\@startPage\@empty
     \gdef\@startPage{1}%
  \else
     \setcounter{page}{\@startPage}%
  \fi
  \thispagestyle{firstpagestyle}%
  \noindent
  \ifcase\ACM@format@nr
  \relax % manuscript
    \box\mktitle@bx\par
    \noindent\hrulefill\par
  \or % acmsmall
    \box\mktitle@bx\par
    \noindent\hrulefill\par
  \or % acmlarge
    \box\mktitle@bx\par
    \noindent\hrulefill\par
  \or % acmtog
    \twocolumn[\box\mktitle@bx]%
  \or % sigconf
    \twocolumn[\box\mktitle@bx]%
  \or % siggraph
    \twocolumn[\box\mktitle@bx]%
  \or % sigplan
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi-a
    \par\box\mktitle@bx\par\bigskip
    \if@ACM@badge
       \marginpar{\noindent
         \ifx\@acmBadgeL@image\@empty\else
           \href{\@acmBadgeL@url}{%
```

```
              \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
            \hskip\@ACM@badge@skip
          \fi
        \ifx\@acmBadgeR@image\@empty\else
          \href{\@acmBadgeR@url}{%
            \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
          \fi}%
    \fi
  \fi
}
```

\@mktitle The title of the article

```
\def\@mktitle{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \@mktitle@i
  \or % acmsmall
    \@mktitle@i
  \or % acmlarge
    \@mktitle@i
  \or % acmtog
    \@mktitle@i
  \or % sigconf
    \@mktitle@iii
  \or % siggraph
    \@mktitle@iii
  \or % sigplan
    \@mktitle@iii
  \or % sigchi
    \@mktitle@iii
  \or % sigchi-a
    \@mktitle@iv
  \fi
}
```

\@titlefont The font to typeset title

```
\def\@titlefont{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \LARGE\bfseries\sffamily
  \or % acmsmall
    \LARGE\bfseries\sffamily
  \or % acmlarge
    \LARGE\bfseries\sffamily
  \or % acmtog
    \Huge\sffamily
  \or % sigconf
    \Huge\sffamily\bfseries
  \or % siggraph
    \Huge\sffamily\bfseries
```

```
  \or % sigplan
    \Huge\bfseries
  \or % sigchi
    \Huge\sffamily\bfseries
  \or % sigchi-a
     \Huge\bfseries
  \fi}
```

`\@subtitlefont` The font to typeset title

```
\def\@subtitlefont{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \mdseries
  \or % acmsmall
    \mdseries
  \or % acmlarge
    \mdseries
  \or % acmtog
     \LARGE
  \or % sigconf
     \LARGE\mdseries
  \or % siggraph
     \LARGE\mdseries
  \or % sigplan
     \LARGE\mdseries
  \or % sigchi
     \LARGE\mdseries
  \or % sigchi-a
     \mdseries
  \fi}
```

`\@mktitle@i` The version of `\mktitle` for most journals

```
\def\@mktitle@i{\hsize=\textwidth
  \@ACM@title@width=\hsize
  \ifx\@acmBadgeL@image\@empty\else
    \advance\@ACM@title@width by -\@ACM@badge@width
    \advance\@ACM@title@width by -\@ACM@badge@skip
  \fi
  \ifx\@acmBadgeR@image\@empty\else
    \advance\@ACM@title@width by -\@ACM@badge@width
    \advance\@ACM@title@width by -\@ACM@badge@skip
  \fi
  \setbox\mktitle@bx=\vbox{\noindent\@titlefont
    \ifx\@acmBadgeL@image\@empty\else
      \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
          \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
      \hskip\@ACM@badge@skip
    \fi
    \parbox[t]{\@ACM@title@width}{\raggedright
      \@titlefont\noindent
```

```
      \@title
  \ifx\@subtitle\@empty\else
    \par\noindent{\@subtitlefont\@subtitle}
  \fi}%
  \ifx\@acmBadgeR@image\@empty\else
    \hskip\@ACM@badge@skip
    \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
        \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
  \fi
  \par\bigskip}}%
```

`\@mktitle@ii` The version of `\mktitle` for TOG. Since v1.06 is subsumed by the `\mktitle@i` macro

`\@mktitle@iii` The version of `\@mktitle` for sigproc. Note that since the title is centered, we leave the space for the left badge even if only the right badge is defined.

```
\def\@mktitle@iii{\hsize=\textwidth
    \setbox\mktitle@bx=\vbox{\@titlefont\centering
      \@ACM@title@width=\hsize
      \if@ACM@badge
        \advance\@ACM@title@width by -2\@ACM@badge@width
        \advance\@ACM@title@width by -2\@ACM@badge@skip
        \parbox[b]{\@ACM@badge@width}{\strut
          \ifx\@acmBadgeL@image\@empty\else
            \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
          \fi}%
        \hskip\@ACM@badge@skip
      \fi
      \parbox[t]{\@ACM@title@width}{\centering\@titlefont
        \@title
        \ifx\@subtitle\@empty\else
          \par\noindent{\@subtitlefont\@subtitle}
        \fi
      }%
      \if@ACM@badge
        \hskip\@ACM@badge@skip
        \parbox[b]{\@ACM@badge@width}{\strut
          \ifx\@acmBadgeR@image\@empty\else
            \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
          \fi}%
      \fi
      \par\bigskip}}%
```

`\@mktitle@iv` The version of `\@mktitle` for sigchi-a

```
\def\@mktitle@iv{\hsize=\textwidth
    \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
      \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
      \noindent\@title
     \ifx\@subtitle\@empty\else
```

```
      \par\noindent\@subtitlefont\@subtitle
    \fi
    \par\bigskip}}%
```

`\@ACM@addtoaddress` The macro adds an item to address using the following rules:

1. If we start a paragraph, add the item
2. Otherwise, add a comma and the item
3. However, the comma is deleted, if it is on the end of the line. We use the magic cleaders trick for this.

```
\newbox\@ACM@commabox
\def\@ACM@addtoaddress#1{%
  \ifvmode\else
    \setbox\@ACM@commabox=\hbox{, }%
    \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
  \fi
  #1}
```

`\institution` `\position` `\department` `\streetaddress` `\city` `\state` `\postcode` `\country` Theoretically we can define the macros for `\affiliation` inside the `\@mkauthors`-style commands. However, this would lead to a strange error if an author uses them outside `\affiliation`. Of course we can make them produce an error message, but…

We follow the strange American tradtion of no comma before zip code.

```
\if@ACM@journal
  \let\position\@gobble
  \def\institution#1{#1\ignorespaces}%
  \newcommand\department[2][0]{}%
  \let\streetaddress\@gobble
  \let\city\@gobble
  \let\state\@gobble
  \let\postcode\@gobble
  \let\country\@gobble
\else
  \def\position#1{#1\par}%
  \def\institution#1{#1\par}%
  \newcommand\department[2][0]{#2\par}%
  \def\streetaddress#1{#1\par}%
  \let\city\@ACM@addtoaddress
  \let\state\@ACM@addtoaddress
  \def\postcode#1{\unskip\space#1}%
  \let\country\@ACM@addtoaddress
\fi
```

`\@mkauthors` Typesetting authors

```
\def\@mkauthors{\begingroup
  \hsize=\textwidth
  \ifcase\ACM@format@nr
  \relax % manuscript
```

```
    \@mkauthors@i
  \or % acmsmall
    \@mkauthors@i
  \or % acmlarge
    \@mkauthors@i
  \or % acmtog
    \@mkauthors@i
  \or % sigconf
    \@mkauthors@iii
  \or % siggraph
    \@mkauthors@iii
  \or % sigplan
    \@mkauthors@iii
  \or % sigchi
    \@mkauthors@iii
  \or % sigchi-a
    \@mkauthors@iv
  \fi
  \endgroup
}
```

`\@authorfont` Somehow different conferences use different fonts for author names. Why?

```
\def\@authorfont{\Large\sffamily}
```

`\@affiliationfont` Font for affiliations

```
\def\@affiliationfont{\normalsize\normalfont}
```

Adjusting fonts for different formats

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
  \def\@authorfont{\large\sffamily}
  \def\@affiliationfont{\small\normalfont}
\or % acmlarge
\or % acmtog
  \def\@authorfont{\LARGE\sffamily}
  \def\@affiliationfont{\large}
\or % sigconf
  \def\@authorfont{\LARGE}
  \def\@affiliationfont{\large}
\or % siggraph
  \def\@authorfont{\normalsize\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigplan
  \def\@authorfont{\Large\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigchi
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
```

```
\or % sigchi-a
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
\fi
```

\@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset them in the journal style

```
\def\@typeset@author@line{%
  \andify\@currentauthors\par\noindent
  \@currentauthors\def\@currentauthors{}%
  \ifx\@currentaffiliations\@empty\else
    \andify\@currentaffiliations
      \unskip, {\@currentaffiliations}\par
  \fi
  \def\@currentaffiliations{}}
```

\@mkauthors@i This is version used in most formats. Note that \and between authors with the same affiliation becomes ␣and␣:

```
\def\@mkauthors@i{%
  \def\@currentauthors{}%
  \def\@currentaffiliations{}%
  \global\let\and\@typeset@author@line
  \def\@author##1{%
    \ifx\@currentauthors\@empty
      \gdef\@currentauthors{\@authorfont\MakeUppercase{##1}}%
    \else
       \g@addto@macro{\@currentauthors}{\and\MakeUppercase{##1}}%
    \fi
    \gdef\and{}}%
  \def\email##1##2{}%
  \def\affiliation##1##2{%
    \def\@tempa{##2}\ifx\@tempa\@empty\else
       \ifx\@currentaffiliations\@empty
          \gdef\@currentaffiliations{\@affiliationfont##2}%
       \else
         \g@addto@macro{\@currentaffiliations}{\and##2}%
      \fi
    \fi
     \global\let\and\@typeset@author@line}%
  \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
    \noindent\addresses\@typeset@author@line
   \par\medskip}%
}
```

\@mkauthors@ii \@mkauthors@iI was version used in acmtog. No longer necessary

\author@bx The box to put individual author to

```
\newbox\author@bx
```

\author@bx@wd The width of the author box

```
\newdimen\author@bx@wd
```

\author@bx@sep The separation between the author boxes

```
\newskip\author@bx@sep
\author@bx@sep=1pc\relax
```

\@typeset@author@bx Typesetting the box with authors. Note that in SIGCHI-A the box is not centered.

```
\def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd\def\and{\par}%
  \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
    \@authorfont\@currentauthors\par\@affiliationfont
    \@currentaffiliation}\egroup
  \box\author@bx\hspace{\author@bx@sep}%
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}}
```

\@mkauthors@iii The `sigconf` version. Here we use centered design with each author in a separate box.

```
\def\@mkauthors@iii{%
```

First, we need to determine the design of the author strip. The boxes are separated by `\author@bx@sep` plus two `\author@bx@sep` margins. This means that each box must be of width $(\texttt{\textwidth} - \texttt{\author@bx@sep})/N - \texttt{\author@bx@sep}$, where N is the number of boxes per row.

```
  \author@bx@wd=\textwidth\relax
  \advance\author@bx@wd by -\author@bx@sep\relax
  \ifcase\num@authorgroups
  \relax % 0?
  \or  % 1=one author per row
  \or  % 2=two authors per row
     \divide\author@bx@wd by \num@authorgroups\relax
  \or  % 3=three authors per row
     \divide\author@bx@wd by \num@authorgroups\relax
  \or  % 4=two authors per row (!)
     \divide\author@bx@wd by 2\relax
  \else % three authors per row
     \divide\author@bx@wd by 3\relax
  \fi
  \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of `\addresses`:

```
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}%
  \def\@author##1{\ifx\@currentauthors\@empty
    \gdef\@currentauthors{\par##1}%
  \else
    \g@addto@macro\@currentauthors{\par##1}%
  \fi
  \gdef\and{}}%
  \def\email##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{\nolinkurl{##2}}%
```

```
  \else
    \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
  \fi}%
  \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{##2}%
  \else
    \g@addto@macro\@currentaffiliation{\par##2}%
  \fi
  \global\let\and\@typeset@author@bx
}%
```

Actual typesetting is done by \and macro:

```
  \hsize=\textwidth
  \global\setbox\mktitle@bx=\vbox{\noindent
    \box\mktitle@bx\par\medskip\leavevmode
    \lineskip=1pc\relax\centering\hspace*{-1em}%
    \addresses\let\and\@typeset@author@bx\and\par\bigskip}}
```

\@mkauthors@iv The sigchia version. Now we put authors in the main text, and no more than 2 authors per line.

```
\def\@mkauthors@iv{%
```

First, we need to determine the design of the author strip. The boxes are separated by \author@bx@sep plus two \author@bx@sep margins. This means that each box must be of width (\textwidth − \author@bx@sep)/N − \author@bx@sep, where N is the number of boxes per row.

```
  \author@bx@wd=\columnwidth\relax
  \advance\author@bx@wd by -\author@bx@sep\relax
  \ifcase\num@authorgroups
  \relax % 0?
  \or  % 1=one author per row
  \else  % 2=two authors per row
     \divide\author@bx@wd by 2\relax
  \fi
  \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}%
  \def\@author##1{\ifx\@currentauthors\@empty
    \gdef\@currentauthors{\par##1}%
  \else
    \g@addto@macro\@currentauthors{\par##1}%
  \fi
  \gdef\and{}}%
  \def\email##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{\nolinkurl{##2}}%
  \else
    \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
  \fi}%
```

```
  \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{##2}%
  \else
    \g@addto@macro\@currentaffiliation{\par##2}%
  \fi
  \global\let\and\@typeset@author@bx}%
%
```

Actual typesetting is done by \and macro

```
    \bgroup\hsize=\columnwidth
    \par\raggedright\leftskip=\z@
    \lineskip=1pc\noindent
    \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}
```

`\@authornotemark` Adding footnotemark to authors

```
\def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark}}
```

`\@mkteasers` Typesetting teasers

```
\def\@mkteasers{%
  \ifx\@teaserfigures\@empty\else
    \def\@teaser##1{\par\bigskip\bgroup
      \captionsetup{type=figure}##1\egroup\par}
    \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
    \noindent\@teaserfigures\par\medskip}%
  \fi}
```

`\@setaddresses` This is an amsart macro, which we do not need.

```
\def\@setaddresses{}
```

`\@mkabstract` Typesetting abstract

```
\def\@mkabstract{\bgroup
  \ifx\@abstract\@lempty\else
  {\phantomsection\addcontentsline{toc}{section}{Abstract}%
    \if@ACM@journal
       \small\noindent
    \else
      \section*{Abstract}%
    \fi
   \ignorespaces\@abstract\par}%
  \fi\egroup}
```

`\@mkbibcitation` Print bibcitation format

```
\def\@mkbibcitation{\bgroup
  \def\footnotemark{}%
  \par\medskip\small\noindent{\bfseries ACM Reference format:}\par\nobreak
  \noindent\authors. \@acmYear. \@title.
  \if@ACM@journal
     \textit{\@journalNameShort}
     \@acmVolume, \@acmNumber, Article~\@acmArticle\ (\@acmPubDate),
```

```
    \ref{TotPages}~pages.
  \else
    In \textit{Proceedings of \acmConference@name, \acmConference@venue,
      \acmConference@date
      \ifx\acmConference@name\acmConference@shortname\else
        \ (\acmConference@shortname)\fi
        ,} \ref{TotPages}~pages.
  \fi\par
  \noindent DOI: \nolinkurl{\@acmDOI}
\par\egroup}
```

`\@printendtopmatter` End the top matter

```
\def\@printendtopmatter{\par\medskip
  \ifcase\ACM@format@nr
  \relax % manuscript
    \noindent\hrulefill\par\medskip
  \or % acmsmall
    \noindent\hrulefill\par\medskip
  \or % acmlarge
    \noindent\hrulefill\par\medskip
  \or % acmtog
    \par\bigskip
  \or % sigconf
    \par\bigskip
  \or % siggraph
    \par\bigskip
  \or % sigplan
    \par\bigskip
  \or % sigchi
    \par\bigskip
  \or % sigchi-a
  \fi
}
```

`\@setthanks` We redefine `\setthanks` using `\long`

```
\def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
```

3.13 Headers and Footers

We use `fancyhdr` for our headers and footers:

```
\RequirePackage{fancyhdr}
```

`\ACM@linecount@bx` This is the box displayed in the review mode

```
\if@ACM@review
  \newsavebox{\ACM@linecount@bx}
  \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{%
    \newlength\ACM@linecount@bxht\setlength{\ACM@linecount@bxht}{-\baselineskip}
     \@tempcnta\@ne\relax
     \loop{\color{ACMRed}\scriptsize\the\@tempcnta}\\
```

```
      \advance\@tempcnta by \@ne
      \addtolength{\ACM@linecount@bxht}{\baselineskip}
      \ifdim\ACM@linecount@bxht<\textheight\repeat}}
\fi
```

`\ACM@linecount` How to display the box

```
\def\ACM@linecount{%
  \if@ACM@review
  \begin{picture}(0,0)%
    \put(-26,-22){\usebox{\ACM@linecount@bx}}%
  \end{picture}%
  \fi}
```

`\@shortauthors` Even if the author redefined `\shortauthors`, we do not print them in the anonymous mode in the headers:

```
\def\@shortauthors{\if@ACM@anonymous Anon.\else\shortauthors\fi}
```

`\@headfootfont` The font to typeset header and footer text.

```
\def\@headfootfont{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \sffamily
  \or % acmsmall
    \sffamily
  \or % acmlarge
    \sffamily
  \or % acmtog
    \sffamily
  \or % sigconf
    \sffamily
  \or % siggraph
    \sffamily
  \or % sigplan
    \sffamily
  \or % sigchi
    \sffamily
  \or % sigchi-a
    \sffamily
  \fi}
```

`standardpagestyle` The pagestyle for all pages but the first one

```
\fancypagestyle{standardpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
  \renewcommand{\footrulewidth}{\z@}%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \fancyhead[LE]{\ACM@linecount\if@ACM@printfolios\thepage\fi}%
    \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
```

```
    \fancyhead[RE]{\@shortauthors}%
    \fancyhead[LO]{\ACM@linecount\shorttitle}%
    \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}%
  \or % acmsmall
   \fancyhead[LE]{\ACM@linecount\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
   \fancyhead[RO]{\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
    \fancyhead[RE]{\@headfootfont\@shortauthors}%
    \fancyhead[LO]{\ACM@linecount\@headfootfont\shorttitle}%
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
  \or % acmlarge
    \fancyhead[LE]{\ACM@linecount\@headfootfont
     \@acmArticle\if@ACM@printfolios:\thepage\fi\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecount}%
    \fancyhead[RO]{\@headfootfont
     \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
  \or % acmtog
    \fancyhead[LE]{\ACM@linecount\@headfootfont
     \@acmArticle\if@ACM@printfolios:\thepage\fi\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecount}%
    \fancyhead[RO]{\@headfootfont
     \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
  \else % Proceedings
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
    \fancyhead[LO]{\ACM@linecount\@headfootfont\shorttitle}%
    \fancyhead[RE]{\@headfootfont\@shortauthors}%
    \fancyhead[LE]{\ACM@linecount\@headfootfont\acmConference@shortname,
      \acmConference@date, \acmConference@venue}%
    \fancyhead[RO]{\@headfootfont\acmConference@shortname,
      \acmConference@date, \acmConference@venue}%
  \fi
  \if@ACM@sigchiamode
     \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
  \fi
}
\pagestyle{standardpagestyle}
```

\@folio@wd
\@folio@ht
\@folio@voffset
\@folio@max

Folio blob width, height, offsets and max number

```
\newdimen\@folio@wd
\@folio@wd=\z@
\newdimen\@folio@ht
\@folio@ht=\z@
\newdimen\@folio@voffset
\@folio@voffset=\z@
\def\@folio@max{1}
\ifcase\ACM@format@nr
```

```
\relax % manuscript
\or % acmsmall
  \@folio@wd=45.75pt\relax
  \@folio@ht=1.25in\relax
  \@folio@voffset=.2in\relax
  \def\@folio@max{8}
\or % acmlarge
  \@folio@wd=43.25pt\relax
  \@folio@ht=79pt\relax
  \@folio@voffset=.55in\relax
  \def\@folio@max{10}
\fi
```

`\@folioblob` The macro to typeset the folio blob.

```
\def\@folioblob{\@tempcnta=\@acmArticleSeq\relax
```

First, we calculate `\@acmArticleSeq` modulo `\@folio@max`

```
  \loop
     \ifnum\@tempcnta>\@folio@max\relax
      \advance\@tempcnta by - \@folio@max
   \repeat
    \advance\@tempcnta by -1\relax
    \@tempdima=\@folio@ht\relax
    \multiply\@tempdima by \the\@tempcnta\relax
    \advance\@tempdima by -\@folio@voffset\relax
    \begin{picture}(0,0)
    \makebox[\z@]{\raisebox{-\@tempdima}{%
        \rlap{%
          \raisebox{-0.45\@folio@ht}[\z@][\z@]{%
            \rule{\@folio@wd}{\@folio@ht}}}%
        \parbox{\@folio@wd}{%
          \centering
          \textcolor{white}{\LARGE\bfseries\sffamily\@acmArticle}}}}
  \end{picture}}

```

`firstpagestyle` The pagestyle for the first page only.

```
\fancypagestyle{firstpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
  \renewcommand{\footrulewidth}{\z@}%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \fancyhead[L]{\ACM@linecount}%
    \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
    \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
  \or % acmsmall
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date:
    \@acmPubDate.}%
```

```
    \fancyhead[LE]{\ACM@linecount\@folioblob}%
    \fancyhead[LO]{\ACM@linecount}%
    \fancyhead[RO]{\@folioblob}%
    \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
  \or % acmlarge
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date:
    \@acmPubDate.}%
    \fancyhead[RO]{\@folioblob}%
    \fancyhead[LE]{\ACM@linecount\@folioblob}%
    \fancyhead[LO]{\ACM@linecount}%
    \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
  \or % acmtog
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date:
    \@acmPubDate.}%
    \fancyhead[L]{\ACM@linecount}%
  \else % Conference proceedings
    \fancyhead[L]{\ACM@linecount}%
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
  \fi
}
```

3.14 Sectioning

Sectioning is different for different levels

```
\renewcommand\section{\@startsection{section}{1}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {.25\baselineskip}%
  {\@secfont}}
\renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {.25\baselineskip}%
  {\@subsecfont}}
\renewcommand\subsubsection{\@startsection{subsubsection}{3}{10pt}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\@subsubsecfont\@adddotafter}}
\renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\@parfont\@adddotafter}}
\renewcommand\part{\@startsection{part}{9}{\z@}%
  {-10\p@ \@plus -4\p@ \@minus -2\p@}%
  {4\p@}%
  {\@parfont}}
```

`\section@raggedright` Special version of `\raggedright` compatible with `\MakeUppercase`

```
\def\section@raggedright{\@rightskip\@flushglue
```

```
  \rightskip\@rightskip
  \leftskip\z@skip
  \parindent\z@}
```

\@secfont
\@subsecfont
\@subsubsecfont
\@parfont

Fonts for sections etc. are different for different formats.

```
\def\@secfont{\sffamily\bfseries\section@raggedright\MakeUppercase}
\def\@subsecfont{\sffamily\bfseries\section@raggedright}
\def\@subsubsecfont{\sffamily\itshape}
\def\@parfont{\itshape}
\setcounter{secnumdepth}{3}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
 \def\@secfont{\sffamily\large\section@raggedright\MakeUppercase}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % acmtog
 \def\@secfont{\sffamily\large\section@raggedright\MakeUppercase}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % sigconf
 \def\@secfont{\bfseries\Large\section@raggedright\MakeUppercase}
 \def\@subsecfont{\bfseries\Large\section@raggedright}
\or % siggraph
 \def\@secfont{\bfseries\sffamily\Large\section@raggedright\MakeUppercase}
 \def\@subsecfont{\bfseries\sffamily\Large\section@raggedright}
\or % sigplan
 \def\@secfont{\bfseries\Large\section@raggedright}
 \def\@subsecfont{\bfseries\section@raggedright}
 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
   {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
   {.25\baselineskip}%
   {\@subsubsecfont}}
 \def\@subsubsecfont{\bfseries\section@raggedright}
 \renewcommand\paragraph{\@startsection{paragraph}{4}{\z@}%
   {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
   {-3.5\p@}%
   {\@parfont\@addspaceafter}}
 \def\@parfont{\bfseries\itshape}
 \renewcommand\subparagraph{\@startsection{subparagraph}{5}{\z@}%
   {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
   {-3.5\p@}%
   {\@subparfont\@addspaceafter}}
 \def\@subparfont{\itshape}
\or % sigchi
 \setcounter{secnumdepth}{1}
 \def\@secfont{\bfseries\sffamily\section@raggedright\MakeUppercase}
 \def\@subsecfont{\bfseries\sffamily\section@raggedright}
\or % sigchi-a
 \setcounter{secnumdepth}{0}
 \def\@secfont{\bfseries\sffamily\section@raggedright\MakeUppercase}
```

```
  \def\@subsecfont{\bfseries\sffamily\section@raggedright}
\fi
```

`\@adddotafter` Add punctuation after the command

```
\def\@adddotafter#1{#1\@addpunct{.}}
```

`\@addspaceafter` Add space after the command

```
\def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

3.15 TOC Lists

`\@dotsep` Related to the `\tableofcontents` are all the horizontal fillers. Base LaTeX defines `\@dottedtocline`, which we should not disable. Yet, this command expects `\@dotsep` to be defined, but leaves this to the class implementation. Since `amsart` does not provide this, we copy the standard variant from `article` here.

```
\providecommand*\@dotsep{4.5}
```

3.16 Theorems

`\@acmplainbodyfont` The font to typeset the `acmplain` theorem style body.

```
\def\@acmplainbodyfont{\itshape}
```

`\@acmplainindent` The amount to indent the `acmplain` theorem style.

```
\def\@acmplainindent{\parindent}
```

`\@acmplainheadfont` The font to typeset the `acmplain` theorem style head.

```
\def\@acmplainheadfont{\scshape}
```

`\@acmplainnotefont` The font to typeset the `acmplain` theorem style note.

```
\def\@acmplainnotefont{\@empty}
```

Customization of `acmplain` theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@acmplainbodyfont{\itshape}
  \def\@acmplainindent{\z@}
  \def\@acmplainheadfont{\bfseries}
  \def\@acmplainnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\fi
```

acmplain The acmplain theorem style

```
\newtheoremstyle{acmplain}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmplainbodyfont}% body font
  {\@acmplainindent}% indent amount
  {\@acmplainheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec
```

\@acmdefinitionbodyfont The font to typeset the acmdefinition theorem style body.

```
\def\@acmdefinitionbodyfont{\normalfont}
```

\@acmdefinitionindent The amount to indent the acmdefinition theorem style.

```
\def\@acmdefinitionindent{\parindent}
```

\@acmdefinitionheadfont The font to typeset the acmdefinition theorem style head.

```
\def\@acmdefinitionheadfont{\itshape}
```

\@acmdefinitionnotefont The font to typeset the acmdefinition theorem style note.

```
\def\@acmdefinitionnotefont{\@empty}
```

Customization of acmdefinition theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@acmdefinitionbodyfont{\normalfont}
  \def\@acmdefinitionindent{\z@}
  \def\@acmdefinitionheadfont{\bfseries}
  \def\@acmdefinitionnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\fi
```

acmdefinition The acmdefinition theorem style

```
\newtheoremstyle{acmdefinition}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmdefinitionbodyfont}% body font
```

```
  {\@acmdefinitionindent}% indent amount
  {\@acmdefinitionheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
  {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
```

The definitions for theorems:

```
\theoremstyle{acmplain}
\newtheorem{theorem}{Theorem}[section]
\newtheorem{conjecture}[theorem]{Conjecture}
\newtheorem{proposition}[theorem]{Proposition}
\newtheorem{lemma}[theorem]{Lemma}
\newtheorem{corollary}[theorem]{Corollary}
\theoremstyle{acmdefinition}
\newtheorem{example}[theorem]{Example}
\newtheorem{definition}[theorem]{Definition}
\theoremstyle{acmplain}
```

`\@proofnamefont` The font to typeset the proof name.

```
\def\@proofnamefont{\scshape}
```

`\@proofindent` Whether or not to indent proofs.

```
\def\@proofindent{\indent}
```

Customization of proof environment.

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@proofnamefont{\itshape}
  \def\@proofindent{\noindent}
\or % sigchi
\or % sigchi-a
\fi
```

`proof` We want some customization of proof environment.

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

3.17 Acknowledgments

\acks This is a comment-like structure

```
\specialcomment{acks}{%
  \begingroup
  \section*{Acknowledgments}
  \phantomsection\addcontentsline{toc}{section}{Acknowledgments}
}{%
  \endgroup
}
```

\grantsponsor We just typeset the name of the sponsor

```
\def\grantsponsor#1#2#3{#2}
```

\grantnum

```
\newcommand\grantnum[3][]{#3%
  \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.18 Conditional typesetting

We use the comment package for conditional typesetting:

```
\if@ACM@screen
  \includecomment{screenonly}
  \excludecomment{printonly}
\else
  \excludecomment{screenonly}
  \includecomment{printonly}
\fi
\if@ACM@anonymous
  \excludecomment{anonsuppress}
  \excludecomment{acks}
\else
  \includecomment{anonsuppress}
\fi
```

3.19 Additional bibliography commands

\showeprint The command \showeprint has two arguments: the (optional) prefix and the eprint number. Right now the only prefix we understand is the (lowercase) word 'arxiv' (see http://arxiv.org/hypertex/bibstyles/.

```
\newcommand\showeprint[2][arxiv]{%
  \def\@tempa{#1}%
  \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
  \def\@tempb{arxiv}%
  \ifx\@tempa\@tempb
     arXiv:\href{http://arxiv.org/abs/#2}{#2}\else arXiv:#2%
  \fi}
```

3.20 End of Class

```
\normalsize\normalfont\frenchspacing
⟨/class⟩
```

References

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Change History

v1.00

General: First released version 23

v1.01

General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1) 23

Defined ACM colors 23

Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4) 25

Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5) 23

v1.02

General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12) 23

Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13) 23

v1.03

\@formatdoi: Added macro 51

General: Added anonsuppress environment 23

Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9) 23

\if@ACM@authorversion: Added macro 24

\maketitle: Added special case of authorversion 54

v1.04

General: Updated bibliography for siggraph 23

\acmArticleSeq: Name change by Matthew Fluet 46

\acmDOI: Name change by Matthew Fluet 47

\acmISBN: Name change by Matthew Fluet 46

v1.05

General: Added processing doi numbers for acmsiggraph and doi numbers for sigproc.bib 23

Patched \setcitestyle command; closes https://github.com/borisveytsman/acmart/issues/19 23

v1.06

\@ACM@badge@skip: Added macro . . 47

\@ACM@badge@width: Added macro . 47

\@ACM@title@width: Added macro . 47

\@mktitle@i: Added processing badges 59

Made generic 59

\@mktitle@ii: Now this macro is obsolete 60

\@mktitle@iii: Added processing badges 60

Made more generic 60

\@mktitle@iv: Made more generic . 60

\@printtopmatter: Added processing badges 57

\@subtitlefont: Added macro 59

\@titlefont: Added macro 58

\acmBadgeL: Added macro 47

\acmBadgeR: Added macro 47

\if@ACM@badge: Added macro 47

v1.07

\maketitle: Corrected a bug with abstract footnotes 54

Corrected a bug with permssion and footnotes order 54

v1.08

General: SIGPLAN reformatting by Matthew Fluet 23

Typos corrected (Tobias Pape) . . . 23

v1.09

General: Revert SIGPLAN caption rules 23

v1.10

General: Changes of 'licensedothergov' wording 50

\maketitle: Corrected a bug with doi in manuscript and author vertsion, https://github.com/

borisveytsman/acmart/issues/36 54
standardpagestyle: Reversed folios location 68
v1.11
General: Customization of ACM theorem styles and proof environment by Matthew Fluet 23
v1.12
\@marginfigure: Now centering by default 37
\@margintable: Now centering by default 37
\@parfont: Moved to \section@raggedright 72
General: Added graceful behavior when libertine fonts are absent . . 35
Documentation updates 23
\copyrightpermissionfootnoterule: Added macro 34
\descriptionlabel: Redefined 38
\footnoterule: Made shorter 34
\if@ACM@natbib@override: Added macro 24
\if@ACM@newfonts: Added macro . . 35
\maketitle: Moved thankses to copyrightpermission box 54
\section@raggedright: Introduced macro 71
v1.13
\@mpfootnotetext: Made minipage footnotes centered 35
General: Font adjustments for acmsmall 62
Increased font size for ACM Large 26
Print bibliographic information by default for the proceedings 48
\bibliographystyle: Redefined macro 32
\bibstyle@acmauthoryear: Added macro 28
\bibstyle@acmnumeric: Added macro 29
\if@ACM@printfolios: Added macro 48
standardpagestyle: Added headers for sigs 68
Expanded headers for sigchi-a . . . 68
Suppressed folios if sig 68
v1.14
General: \citestyle updates (Matthew Fluet) 23
Patched \citestyle 27
\bibstyle@acmauthoryear: Moved def of \bibstyle@acmauthoryear before use 28
\bibstyle@acmnumeric: Moved def of \bibstyle@numeric before use . . 29
v1.15
\@ACM@addtoaddress: Added macro 61
\@mkauthors@iii: New authors system 64
\@shortauthors: Introduced macro . 68
\@typeset@author@bx: Moved to separate macro 64
\acks: Added macro 76
\affiliation: Added code for author groups 45
\author: Added code for author groups 44
\city: Added macro 61
\country: Added macro 61
\department: Added macro 61
\grantnum: Added macro 76
\grantsponsor: Added macro 76
\if@insideauthorgroup: Introduced macro 44
\institution: Added macro 61
\num@authorgroups: Renamed 44
\orcid: Introduced macro 45
\position: Added macro 61
\postcode: Added macro 61
\state: Added macro 61
\streetaddress: Added macro 61
standardpagestyle: Better handling of anonymous mode 68
v1.16
\@headfootfont: Added macro 68
General: Formatting header/footer (Matthew Fluet) 23
standardpagestyle: Customize header/footer text font 68
v1.17
\@makefnmark: Redefined 35
\@mkauthors: TOG now uses the same authors block as other journals . . 61
\@mkauthors@ii: Deleted 63
\@mkbibcitation: Added \nobreak 66
Changed format for sigs 66

General: Slightly decreased margins for sigs . . . 32
\acmArticle: The default is now numerical . . . 46
\acmMonth: The default must be numerical. Closes #50. . . . 46
\acmNumber: The default is now numerical . . . 46
\acmVolume: The default is now numerical . . . 46
\acmYear: The default is now numerical . . . 46
\description: Decreased indent . . . 38
\grantnum: Added url . . . 76
\grantsponsor: Renamed . . . 76
\if@ACM@printacmref: Renamed from \if@ACM@printbib . . . 48
standardpagestyle: Added paper title to sigs . . . 68
v1.18
\@mkauthors@i: Now we andify affiliations . . . 63
\@typeset@author@line: Added macro . . . 63
General: Natbib is now the default for all formats . . . 23
v1.19
\@mkabstract: Include 'Abstract' in PDF bookmarks (Matthew Fluet) . 66
General: Include 'Abstract', 'Acknowledgements', and 'References' in PDF bookmarks (Matthew Fluet) . 23
Include 'References' in PDF bookmarks (Matthew Fluet) . . . 27
\acks: Include 'Acknowledgements' in PDF bookmarks (Matthew Fluet) . 76
v1.20
\@mkabstract: Deleted spurious space 66
General: Bug fixes for bst . . . 23
v1.21
\showeprint: Added macro . . . 76
v1.22
General: More bibliography changes for Aptara . . . 23
v1.23
General: Add PACMPL journal option 23
v1.24
General: Add IMWUT journal option 38
v1.25
General: Updated PACMPL . . . 38
v1.26
General: Corrected \shortcite bug . 23
Documentation typos fixed (thanks to Stephen Spencer) . . . 23
v1.27
\if@ACM@printccs: Typo corrected . 48
v1.28
General: Corrected option natbib behavior . . . 29
Got rid of warnings in pdf keywords 31
\ccsdesc@parse: Change from \to to \textrightarrow (Matteo Riondato) . . . 49
v1.29
\@mkabstract: Removed spurious indentation (John Wickerson) . . . 66
General: Increased head to 13pt . . . 32
\ccsdesc@parse: Add spacing after bullet and around rightarrow; semicolon separators no longer in bold/italic (John Wickerson) . . . 49
standardpagestyle: Corrected printfolios (Matthew Fluet) . . . 68
v1.30
General: Added \frenchspacing . . . 77
Bibtex style now recognizes https:// in doi . . . 23
Switched to T1: looks like libertine has problems with \l in OT1 . . . 35
Updated IMWUT and PACMPL . . 38
\department: Added optional parameter . . . 61

Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

Symbols

\$ 1324, 1328
\@ 1120, 1123, 1128, 1132, 1135, 1138, 1140, 1143, 1223, 1230, 1243
\@@par 281, 332
\@ACM@addtoaddress . 1560, 1581, 1582, 1584
\@ACM@badge@skip 987, 1423, 1500, 1504, 1510, 1519, 1529, 1535, 1544
\@ACM@badge@width 984, 1422, 1427, 1499, 1503, 1509, 1521, 1528, 1530, 1533, 1545, 1548
\@ACM@badgefalse . . . 983
\@ACM@badgetrue . 989, 994
\@ACM@commabox 1560, 1563, 1564
\@ACM@journalfalse . 114, 116, 118, 120, 122
\@ACM@journaltrue 106, 108, 110, 112
\@ACM@manuscriptfalse 101
\@ACM@manuscripttrue 99
\@ACM@natbib@overridefalse 69
\@ACM@natbib@overridetrue 71
\@ACM@natbibtrue . . . 126
\@ACM@newfontsfalse 521, 523, 526
\@ACM@newfontstrue . 518
\@ACM@sigchiamodefalse 103
\@ACM@sigchiamodetrue 123
\@ACM@title@width 986, 1497, 1499, 1500, 1503, 1504, 1512, 1526, 1528, 1529, 1537
\@DeclareACMFormat 33, 34, 35, 36, 37, 38, 39, 40, 41, 42
\@M 281, 314, 332
\@abstract 1006, 1766, 1773
\@acmArticle . . . 964, 967, 1323, 1781, 1865, 1866, 1870, 1873, 1876, 1878, 1881, 1884, 1886, 1937, 1951, 1959, 1967
\@acmArticleSeq . 966, 1921
\@acmBadgeL@image 996, 998, 1420, 1422, 1498, 1507, 1509, 1531, 1533
\@acmBadgeL@url . 995, 997, 1421, 1508, 1532
\@acmBadgeR@image 991, 993, 1425, 1427, 1502, 1518, 1521, 1546, 1548
\@acmBadgeR@url . 990, 992, 1426, 1520, 1547
\@acmDOI . . 980, 1316, 1319, 1325, 1329, 1790
\@acmISBN 978, 1327
\@acmMonth . 970, 972, 1323
\@acmNumber 962, 1781, 1870, 1878, 1886, 1951, 1959, 1967
\@acmPrice . 976, 1324, 1328
\@acmPubDate . . . 972, 1781, 1870, 1878, 1886, 1952, 1960, 1968
\@acmVolume 960, 1781, 1869, 1877, 1885, 1950, 1958, 1966
\@acmYear 968, 975, 1251, 1323, 1778
\@acmdefinitionbodyfont . . . 2079, 2091, 2103
\@acmdefinitionheadfont . . . 2081, 2093, 2105
\@acmdefinitionindent . . . 2080, 2092, 2104
\@acmdefinitionnotefont . . . 2082, 2094, 2108
\@acmownedfalse . 1087, 1090, 1093, 1098, 1101, 1104, 1107, 1113
\@acmownedtrue 1076, 1083, 1110
\@acmplainbodyfont . . . 2049, 2061, 2073
\@acmplainheadfont . . . 2051, 2063, 2075
\@acmplainindent 2050, 2062, 2074
\@acmplainnotefont . . . 2052, 2064, 2078
\@adddotafter 1986, 1990, 2046
\@addpunct 1813, 2046, 2047, 2139
\@addspaceafter 2030, 2035, 2047
\@affiliationfont . . 1611, 1616, 1620, 1623, 1626, 1629, 1632, 1635, 1660, 1676
\@afterheading . 306, 1365
\@afterindentfalse 259, 1364
\@afterindenttrue . . 257
\@author . . . 893, 896, 901, 1649, 1699, 1734
\@authorfont 1610, 1615, 1619, 1622, 1625, 1628, 1631, 1634, 1651, 1676
\@authornotemark 956, 1756
\@authornotes 953, 957, 1283
\@auxout 391
\@begindocumenthook 387

\@citestyle 191
\@classname 25, 30, 46, 48, 49, 54, 56, 57, 62, 64, 65, 73, 75, 76, 80, 82, 83, 94, 150, 519, 522, 524, 862, 864, 1011, 1013, 1014, 1017, 1019, 1020, 1023, 1025, 1026
\@clubpenalty 320
\@concepts 1059, 1066, 1337, 1339, 1362
\@copyrightowner 1117, 1300
\@copyrightpermission 1146, 1292
\@copyrightyear 1250, 1300, 1302
\@currbox . . . 593, 594, 595
\@currentaffiliation 1677, 1680, 1698, 1705, 1706, 1708, 1710, 1711, 1713, 1733, 1740, 1741, 1743, 1745, 1746, 1748
\@currentaffiliations 1640, 1641, 1642, 1644, 1647, 1659, 1660, 1662
\@currentauthors 1638, 1639, 1646, 1650, 1651, 1653, 1676, 1679, 1697, 1699, 1700, 1702, 1732, 1734, 1735, 1737, 1756
\@currentlabel . 496, 510
\@dblarg 268
\@dblfloat 577
\@dotsep 2048
\@empty 128, 271, 877, 891, 906, 911, 912, 918, 1040, 1041, 1047, 1054, 1059, 1286, 1316, 1328, 1337, 1342, 1346, 1389, 1420, 1425, 1498, 1502, 1507, 1515, 1518, 1531, 1539, 1546, 1556, 1640, 1650, 1658, 1659, 1699, 1705, 1710, 1734, 1740, 1745, 1758, 2052, 2082, 2152, 2168
\@endfloatbox 579
\@endpefalse 2141
\@endwidefloatbox 579, 587
\@finalstrut . . . 501, 514
\@float 581
\@flushglue 1995
\@fnsymbol 1271
\@folio@ht 1901, 1927, 1933, 1934
\@folio@max 1901, 1923, 1924
\@folio@voffset 1901, 1929
\@folio@wd 1901, 1934, 1935, 1956, 1964
\@folioblob 1921, 1953, 1955, 1961, 1962
\@footnotemark . 338, 1269
\@footnotemark@nolink 338, 1269
\@footnotetext 339, 492, 1270
\@footnotetext@nolink 339, 1270
\@for 167
\@formatdoi . . . 1145, 1319
\@fps 580
\@fpsadddefault 580
\@gobble 189, 233, 1568, 1571, 1572, 1573, 1574, 1575
\@hangfrom 280, 331
\@headfootfont 1832, 1865, 1866, 1867, 1868, 1872, 1875, 1880, 1883, 1889, 1890, 1891, 1893
\@ifnotempty 1256
\@ifnum 205, 207
\@ifstar 266
\@iiiparbox 490
\@insideauthorgroupfalse 926
\@insideauthorgrouptrue 889
\@journalCode . . 620, 862
\@journalCode@nr 620, 671, 867
\@journalName 673, 677, 681, 686, 690, 694, 698, 702, 706, 707, 709, 710, 713, 717, 721, 723, 727, 731, 733, 735, 737, 741, 745, 749, 753, 757, 761, 765, 769, 773, 777, 781, 785, 789, 793, 794, 797, 801, 802, 805, 810, 814, 818, 822, 826, 830, 834, 838, 842, 846, 850, 854, 858, 868, 869, 1312, 1869, 1877, 1885, 1950, 1958, 1966
\@journalNameShort . . . 674, 678, 683, 687, 691, 695, 699, 703, 714, 718, 724, 728, 738, 742, 746, 750, 754, 758, 762, 766, 770, 774, 778, 782, 786, 790, 798, 803, 806, 811, 815, 819, 823, 827, 831, 835, 839, 843, 847, 851, 855, 859, 869, 1780
\@keywords 1003, 1346, 1352
\@latex@error 235
\@lempty 1008, 1766
\@makefnmark . . . 491, 516, 1275, 1280, 1284
\@makefntext 491, 500, 513, 1285
\@marginfigure . 569, 570
\@margintable . . 572, 573
\@minipagefalse . 487, 589
\@minus . . . 1976, 1980, 1984, 1988, 1992, 2023, 2028, 2033, 2070, 2072, 2100, 2102
\@mkabstract . . 1335, 1765
\@mkauthors 1276, 1278, 1586
\@mkauthors@i . . 1590, 1592, 1594, 1596, 1645
\@mkauthors@ii 1670

\@mkauthors@iii . 1598, 1600, 1602, 1604, 1681
\@mkauthors@iv 1606, 1722
\@mkbibcitation 1359, 1775
\@mkteasers ... 1276, 1757
\@mktitle 1276, 1432
\@mktitle@i 1435, 1437, 1439, 1441, 1496
\@mktitle@ii 1524
\@mktitle@iii .. 1443, 1445, 1447, 1449, 1524
\@mktitle@iv .. 1451, 1552
\@mpargs 490
\@mparswitchfalse .. 455
\@mpfootins 482, 483, 485, 505, 506
\@mpfootnotetext ... 504
\@ne 193, 197, 201, 203, 380, 1819, 1821
\@nil 212
\@nobreakfalse 308
\@noskipsecfalse ... 312
\@noskipsectrue 309
\@par 1288
\@parboxrestore 509
\@parfont . 1990, 1994, 1999
\@permissionCodeOne 675, 679, 684, 688, 692, 696, 700, 704, 711, 715, 719, 725, 729, 739, 743, 747, 751, 755, 759, 763, 767, 771, 775, 779, 783, 787, 791, 795, 799, 807, 812, 816, 820, 824, 828, 832, 836, 840, 844, 848, 852, 856, 860, 870, 1323
\@permissionCodeTwo 808, 871
\@plus 1976, 1980, 1984, 1988, 1992, 2023, 2028, 2033, 2069, 2071, 2099, 2101, 2136
\@printcopyrightfalse 1086, 1097
\@printcopyrighttrue 1072, 1082
\@printendtopmatter 1363, 1792
\@printpermissionfalse 1085
\@printpermissiontrue ... 1074, 1081, 1096
\@printtopmatter 1277, 1388
\@proofindent 2120, 2130, 2138
\@proofnamefont 2119, 2129, 2139
\@received . 1038, 1041, 1042, 1044, 1047, 1048, 1050, 1054, 1055
\@rightskip ... 1995, 1996
\@saveabstract 1005, 1006
\@saveteaser .. 1253, 1254
\@seccntformat . 274, 325
\@secfont 1978, 1999
\@secpenalty 264
\@sect 268, 269
\@setaddresses 1764
\@setthanks ... 1288, 1813
\@shortauthors 1831, 1861, 1867, 1873, 1881, 1890
\@sidebar 566, 567
\@specialsection 1338, 1343, 1348, 1350, 1367
\@ssect 267, 326
\@startPage 999, 1389, 1390, 1392
\@startsection 253, 1975, 1979, 1983, 1987, 1991, 2022, 2027, 2032
\@subparfont .. 2035, 2036
\@subsecfont .. 1982, 1999
\@subsubsecfont 1986, 1999
\@subtitle 882, 945, 1515, 1516, 1539, 1540, 1556, 1557
\@subtitlefont 1475, 1516, 1540, 1557
\@subtitlenotes 943, 947, 950, 1282
\@svsec . 271, 274, 280, 292
\@svsechd ... 290, 315, 335
\@teaser 1254, 1759
\@teaserfigures 1252, 1254, 1758, 1762
\@tempa 167, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 215, 217, 219, 221, 223, 225, 910, 911, 1039, 1040, 1658, 2152, 2167, 2168, 2170
\@tempb 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 215, 217, 219, 221, 223, 225, 2169, 2170
\@tempboxa 490
\@tempc . 213, 214, 216, 218, 220, 222, 224, 226
\@tempcnta 1819, 1820, 1821, 1921, 1923, 1924, 1926, 1928
\@tempdima 1927, 1928, 1929, 1931
\@tempskipa 256, 258, 259, 264, 276, 277, 302, 303, 305, 317, 318, 327, 328
\@terms .. 1001, 1342, 1344
\@textsuperscript 516, 1275, 1280
\@thefnmark . 497, 511, 516, 1275, 1280, 1284
\@title ... 936, 1362, 1514, 1538, 1555, 1778
\@titlefont 1454, 1506, 1513, 1525, 1537, 1553
\@titlenotes 934, 938, 941, 1281
\@topnum 1272
\@typeset@author@bx 1674, 1715, 1721, 1750, 1755
\@typeset@author@line 1637, 1648, 1665, 1667
\@undefined 387
\@width 473, 478

\@xsect 300, 301, 337
\@z 199
\\ 1305, 1320, 1324, 1328, 1820
\{ 175
\} 175

\␣ 1065, 1300, 1302, 1323, 1781, 1787

A

\abstract 1005
abstract (environment) *14*
\acks 2143
acks (environment) *18*
\acm@copyrightinput 1078
\acm@copyrightmode 1078, 1084, 1089, 1092, 1095, 1100, 1103, 1106, 1109, 1112, 1118, 1147
\ACM@fontsize 86, 128, 131, 133, 135, 137, 139, 141, 143, 145, 147, 150, 151
\ACM@format 27, 94
\ACM@format@nr 27, 94, 98, 104, 129, 348, 403, 460, 545, 597, 1368, 1396, 1433, 1455, 1476, 1588, 1612, 1793, 1833, 1857, 1908, 1944, 2004, 2053, 2083, 2121
\ACM@linecount 1825, 1859, 1862, 1865, 1868, 1872, 1874, 1880, 1882, 1889, 1891, 1946, 1953, 1954, 1962, 1963, 1969, 1971
\ACM@linecount@bx 1815, 1828
\ACM@linecount@bxht . . . 1818, 1822, 1823
\acmArticle *12*, 964
\acmArticleSeq . . *12*, 966
\acmBadgeL *12*, 994
\acmBadgeR *12*, 989
\acmConference . . . *7*, 872
\acmConference@date 875, 1314, 1785, 1892, 1894
\acmConference@name 874, 1314, 1784, 1786
\acmConference@shortname 873, 877, 878, 1296, 1786, 1787, 1891, 1893
\acmConference@venue 876, 1296, 1784, 1892, 1894
\acmdefinition 2098
\acmDOI *12*, 980
\acmISBN *12*, 978
\acmJournal *7*, 866
\acmMonth *12*, 970
\acmNumber *12*, 962
\acmplain 2068
\acmPrice *12*, 976
\acmVolume *12*, 960
\acmYear *12*, 968
\addcontentsline 163, 284, 294, 1767, 2146
\addpenalty 264
\addresses . . 891, 893, 896, 901, 928, 932, 956, 1667, 1721, 1755
\addtolength 1822
\addvspace 264
\advance . . 888, 1499, 1500, 1503, 1504, 1528, 1529, 1683, 1696, 1724, 1731, 1821, 1924, 1926, 1929
\affiliation *9*, 925, 1657, 1710, 1745
\and 901, 902, 915, 921, 1648, 1653, 1655, 1662, 1665, 1674, 1704, 1715, 1721, 1739, 1750, 1755
\andify 1354, 1355, 1638, 1641
anonsuppress (environment) *18*
\AtBeginDocument . . . 388
\AtEndDocument 1053
\author . *9*, 886, 1265, 1266
\author@bx 1670, 1675, 1678
\author@bx@sep 1672, 1678, 1683, 1696, 1724, 1731
\author@bx@wd 1671, 1674, 1682, 1683, 1688, 1690, 1692, 1694, 1696, 1723, 1724, 1729, 1731
\authornote *11*, 954
\authors 894, 897, 902, 1354, 1356, 1361, 1778

B

\baselineskip 1290, 1508, 1520, 1532, 1547, 1818, 1822, 1976, 1977, 1980, 1981, 1984, 1988, 2023, 2024, 2028, 2033, 2069, 2070, 2071, 2072, 2099, 2100, 2101, 2102
\begin 20, 1827, 1930
\begingroup 278, 315, 329, 379, 1268, 1586, 2144
\bfseries 612, 1457, 1459, 1461, 1465, 1467, 1469, 1471, 1473, 1631, 1634, 1777, 1937, 1999, 2000, 2014, 2015, 2017, 2018, 2020, 2021, 2026, 2031, 2039, 2040, 2043, 2044, 2063, 2093
\bgroup 567, 570, 573, 578, 1337, 1342, 1346, 1674, 1752, 1759, 1765, 1775
\bibfont 165
\bibliofont 165
\bibliographystyle . 386
\bibsection 161
\bibstyle 189, 191, 233, 391
\bibstyle@acmauthoryear 239
\bibstyle@acmnumeric 245

\bigskip 1055, 1417, 1523, 1551, 1559, 1721, 1755, 1759, 1801, 1803, 1805, 1807, 1809
\box 594, 1398, 1401, 1404, 1407, 1409, 1411, 1413, 1415, 1417, 1666, 1678, 1719, 1761

C

\c@footnote 1271
\c@secnumdepth 270, 285, 295
\captionsetup 537, 539, 541, 543, 552, 554, 557, 560, 567, 570, 573, 1760
\ccsdesc *13*, 1060
\ccsdesc@parse 1061, 1062
CCSXML (environment) . . *13*
\centering 512, 571, 574, 1525, 1537, 1675, 1720, 1936
\cite 371, 372, 385
\citeA 378
\citealt 377
\citeANP 373
\citeauthor 373
\citeN 371
\citename 383
\citeNN 374
\citeNP 377
\citep 372
\citestyle . . . *19*, 231, 251
\citeyear . . . 375, 376, 385
\citeyearNP 375
\citeyearpar . . . 374, 376
\city *10*, 1567
\ClassError 30, 864, 1014, 1020, 1026
\ClassInfo . . . 94, 150, 862, 1011, 1013, 1017, 1019, 1023, 1025
\ClassWarning 519, 522, 524
\cleaders 1564
\clubpenalty . . . 314, 320
\CodelineIndex 17
\Collect@Body . . 566, 569, 572, 1005, 1253
\color 1820
\color@begingroup 499, 512
\color@endbox 592
\color@endgroup 488, 502, 515
\columnwidth . . . 473, 508, 578, 1723, 1752
\copy 1564
\copyright 1300
\copyrightpermissionfootnoterule 472
\copyrightyear . *14*, 1250
\country *10*, 1567
\csname 233, 283, 286, 293, 296, 325, 497, 511, 1064, 1065, 1066, 1067
\CurrentOption 87, 88, 89, 90, 91, 92

D

\DeclareNewFootnote 476
\DeclareOptionX . . 33, 87, 88, 89, 90, 91, 92
\DeclareRobustCommand 378
\def 25, 33, 86, 131, 133, 135, 137, 139, 141, 143, 145, 147, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 204, 206, 208, 210, 211, 215, 217, 219, 221, 223, 225, 253, 269, 290, 301, 325, 326, 335, 342, 343, 344, 345, 385, 386, 472, 477, 479, 491, 493, 504, 516, 567, 570, 573, 578, 580, 584, 587, 605, 606, 607, 608, 673, 674, 675, 677, 678, 679, 681, 683, 684, 686, 687, 688, 690, 691, 692, 694, 695, 696, 698, 699, 700, 702, 703, 704, 706, 707, 709, 710, 711, 713, 714, 715, 717, 718, 719, 721, 723, 724, 725, 727, 728, 729, 731, 733, 735, 737, 738, 739, 741, 742, 743, 745, 746, 747, 749, 750, 751, 753, 754, 755, 757, 758, 759, 761, 762, 763, 765, 766, 767, 769, 770, 771, 773, 774, 775, 777, 778, 779, 781, 782, 783, 785, 786, 787, 789, 790, 791, 793, 794, 795, 797, 798, 799, 801, 802, 803, 805, 806, 807, 808, 810, 811, 812, 814, 815, 816, 818, 819, 820, 822, 823, 824, 826, 827, 828, 830, 831, 832, 834, 835, 836, 838, 839, 840, 842, 843, 844, 846, 847, 848, 850, 851, 852, 854, 855, 856, 858, 859, 860, 866, 867, 868, 869, 870, 871, 882, 910, 934, 935, 943, 944, 953, 954, 960, 962, 964, 966, 968, 970, 972, 976, 978, 980, 990, 991, 992, 993, 995, 996, 997, 998, 999, 1001, 1003, 1006, 1008, 1027, 1038, 1039, 1063, 1115, 1117, 1145, 1146, 1250, 1252, 1254, 1263, 1275, 1280, 1288, 1367, 1388, 1432, 1454, 1475, 1496, 1524, 1552, 1561, 1569, 1577, 1578, 1580, 1583, 1586, 1610, 1611, 1615,

1616, 1619, 1620, 1622, 1623, 1625, 1626, 1628, 1629, 1631, 1632, 1634, 1635, 1637, 1639, 1644, 1645, 1646, 1647, 1649, 1656, 1657, 1658, 1674, 1681, 1699, 1705, 1710, 1722, 1734, 1740, 1745, 1756, 1757, 1759, 1764, 1765, 1775, 1776, 1792, 1813, 1825, 1831, 1832, 1907, 1914, 1919, 1921, 1995, 1999, 2000, 2001, 2002, 2008, 2009, 2011, 2012, 2014, 2015, 2017, 2018, 2020, 2021, 2026, 2031, 2036, 2039, 2040, 2043, 2044, 2046, 2047, 2049, 2050, 2051, 2052, 2061, 2062, 2063, 2064, 2079, 2080, 2081, 2082, 2091, 2092, 2093, 2094, 2119, 2120, 2129, 2130, 2150, 2152, 2167, 2168, 2169

\define@boolkey 44, 52, 60, 70, 78, 1009, 1015, 1021

\define@choicekey 27, 620, 1077

\definecolor 394, 395, 396, 397, 398, 399, 400, 401

\department *10*, 1567

\description 613

\descriptionlabel 612, 615

\dimexpr . . 576, 594, 1897

\divide 1688, 1690, 1692, 1694, 1729

\do 167

\DocInput 21

\documentclass 9

\dots 1328

E

\edef 87, 88, 89, 90

\egroup 489, 568, 571, 574, 585, 591, 1339, 1344, 1352, 1677, 1755, 1760, 1774, 1791

\else . . . 47, 55, 63, 74, 81, 100, 125, 213, 234, 263, 272, 285, 289, 295, 307, 319, 334, 367, 382, 385, 387, 482, 542, 887, 895, 899, 900, 909, 914, 917, 920, 927, 931, 940, 949, 955, 1012, 1018, 1024, 1031, 1034, 1043, 1046, 1049, 1054, 1068, 1069, 1259, 1276, 1286, 1291, 1294, 1295, 1301, 1306, 1313, 1318, 1321, 1326, 1328, 1337, 1342, 1346, 1349, 1391, 1420, 1425, 1498, 1502, 1507, 1515, 1518, 1531, 1539, 1546, 1556, 1562, 1576, 1640, 1652, 1658, 1661, 1675, 1693, 1701, 1707, 1712, 1728, 1736, 1742, 1747, 1758, 1766, 1770, 1783, 1786, 1831, 1887, 1970, 2152, 2156, 2163, 2171

\email *9*, 930, 1656, 1705, 1740

\emph 1312, 1314

\EnableCrossrefs 19

\end 22, 1829, 1938

\end@dblfloat 583

\end@float 585

\endcsname 232, 233, 283, 286, 293, 296, 325, 497, 511, 1064, 1065, 1066, 1067

\enddescription 619

\endgroup . . . 282, 315, 333, 1333, 1608, 2148

\endlist 617, 619

\endminipage 479

\endtrivlist 2141

\enspace 2047

environments:

abstract *14*

acks *18*

anonsuppress *18*

CCSXML *13*

marginfigure *17*

margintable *17*

printonly *17*

screenonly *17*

sidebar *17*

teaserfigure *14*

\everypar . . . 262, 310, 321

\excludecomment . 1058, 2155, 2157, 2161, 2162

\ExecuteOptionsX 43, 51, 59, 67, 85

\expandafter 212, 214, 388, 490, 1064, 1065, 1067

F

\familydefault 534

\fancyfoot 1863, 1869, 1877, 1885, 1888, 1947, 1948, 1950, 1958, 1966, 1972

\fancyhead . 1859, 1860, 1861, 1862, 1865, 1866, 1867, 1868, 1872, 1874, 1875, 1880, 1882, 1883, 1889, 1890, 1891, 1893, 1946, 1953, 1954, 1955, 1961, 1962, 1963, 1969, 1971

\fancyheadoffset 1897, 1956, 1964

\fancyhf 1854, 1941

\fancypagestyle 1853, 1940

\fi . . . 49, 57, 65, 76, 83, 102, 124, 127, 148, 149, 158, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187,

189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 216, 218, 220, 222, 224, 226, 227, 236, 238, 252, 254, 260, 265, 275, 287, 297, 299, 322, 323, 336, 360, 369, 384, 385, 389, 392, 457, 471, 486, 503, 532, 535, 562, 563, 582, 586, 611, 861, 879, 890, 898, 903, 904, 908, 916, 922, 923, 924, 929, 933, 942, 952, 959, 975, 1014, 1020, 1026, 1036, 1037, 1045, 1051, 1052, 1056, 1066, 1070, 1088, 1091, 1094, 1099, 1102, 1105, 1108, 1111, 1114, 1144, 1249, 1261, 1266, 1267, 1276, 1278, 1289, 1292, 1293, 1297, 1298, 1303, 1315, 1320, 1328, 1330, 1331, 1332, 1340, 1341, 1345, 1351, 1353, 1360, 1387, 1393, 1424, 1428, 1429, 1430, 1452, 1474, 1495, 1501, 1505, 1511, 1517, 1522, 1534, 1536, 1541, 1549, 1550, 1558, 1565, 1585, 1607, 1636, 1643, 1654, 1663, 1664, 1675, 1695, 1703, 1709, 1714, 1730, 1738, 1744, 1749, 1763, 1772, 1774, 1787, 1789, 1811, 1824, 1830, 1831, 1852, 1859, 1860, 1865, 1866, 1873, 1876, 1881, 1884, 1888, 1895, 1898, 1920, 1947, 1972, 1973, 2045, 2067, 2097, 2133, 2152, 2159, 2165, 2168, 2172

\firstpagestyle 1940
\floatname 565
\footnotemark . . 345, 936, 945, 1756, 1776
\footnoterule 477
\footnotesep . . . 501, 514
\footnotesize . . 507, 1863, 1869, 1877, 1885, 1888, 1948, 1950, 1958, 1966, 1972
\footnotetext 939, 941, 948, 951, 958
\footnotetextcopyrightpermission 1287, 1290
\footrulewidth 1856, 1943
\format 27
\frenchspacing 2173
\fulltextwidth 575, 578, 594

G

\g@addto@macro 901, 902, 915, 921, 928, 932, 936, 938, 941, 945, 947, 950, 956, 957, 1044, 1050, 1066, 1067, 1254, 1258, 1260, 1653, 1662, 1702, 1708, 1713, 1737, 1743, 1748, 1756
\gdef 873, 874, 875, 876, 878, 893, 894, 896, 897, 907, 913, 919, 1006, 1042, 1048, 1065, 1390, 1651, 1655, 1660, 1679, 1680, 1697, 1698, 1700, 1704, 1706, 1711, 1732, 1733, 1735, 1739, 1741, 1746
\geometry 405, 407, 413, 419, 425, 431, 437, 443, 449
\global . 309, 312, 505, 593, 888, 889, 926, 1356, 1357, 1648, 1665, 1666, 1675, 1715, 1718, 1750, 1761
\grantnum *18*, 2151
\grantsponsor . . *18*, 2150

H

\hbox . 516, 1275, 1280, 1563
\headrulewidth 1855, 1942
\hfill 1554
\href . 1421, 1426, 1508, 1520, 1532, 1547, 2171
\hrule 473, 478, 1554
\hrulefill . 1399, 1402, 1405, 1795, 1797, 1799
\hsize 508, 1274, 1496, 1497, 1524, 1526, 1552, 1587, 1674, 1717, 1752
\hskip 280, 291, 318, 331, 335, 1423, 1510, 1519, 1535, 1544, 1564, 2138
\hspace . . . 612, 1157, 1168, 1177, 1194, 1208, 1220, 1678, 1720
\Huge 1463, 1465, 1467, 1469, 1471, 1473
\hypersetup 362, 368, 1361

I

\if 213, 1342
\if@ACM@anonymous 78, 892, 900, 905, 927, 931, 937, 946, 955, 1257, 1264, 1831, 2160
\if@ACM@authorversion 60, 1291, 1307
\if@ACM@badge 982, 1418, 1527, 1543
\if@ACM@journal 96, 538, 1032, 1295, 1311, 1322, 1347, 1567, 1768, 1779
\if@ACM@manuscript 95, 155, 1029, 1294, 1304
\if@ACM@natbib 70, 159, 250, 370

\if@ACM@natbib@override 68, 125
\if@ACM@newfonts 517, 527
\if@ACM@printacmref 1015, 1358
\if@ACM@printccs 1009, 1336
\if@ACM@printfolios 1021, 1859, 1860, 1865, 1866, 1873, 1876, 1881, 1884, 1888, 1947, 1972
\if@ACM@review 52, 1815, 1826
\if@ACM@screen 44, 361, 2153
\if@ACM@sigchiamode 97, 492, 533, 577, 583, 1276, 1278, 1675, 1896
\if@acmowned 1075
\if@filesw 390
\if@insideauthorgroup 886, 887
\if@nobreak 261
\if@noskipsec . . 254, 311
\if@printcopyright 1071, 1299
\if@printpermission 1073, 1292
\ifcase . 104, 129, 348, 403, 460, 545, 597, 671, 972, 1118, 1147, 1368, 1396, 1433, 1455, 1476, 1588, 1612, 1684, 1725, 1793, 1833, 1857, 1908, 1944, 2004, 2053, 2083, 2121
\ifcsname 232
\ifdim 258, 277, 303, 328, 1823
\IfFileExists 519, 522, 524
\ifNAT@numbers 385
\ifnum 98, 270, 285, 295, 1068, 1069, 1084, 1089, 1092, 1095, 1100, 1103, 1106, 1109, 1112, 1266, 1923
\ifvmode 1562
\ifvoid 482
\ifx 128, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 215, 217, 219, 221, 223, 225, 387, 877, 891, 906, 911, 912, 918, 1040, 1041, 1047, 1054, 1064, 1286, 1316, 1328, 1337, 1346, 1389, 1420, 1425, 1498, 1502, 1507, 1515, 1518, 1531, 1539, 1546, 1556, 1640, 1650, 1658, 1659, 1699, 1705, 1710, 1734, 1740, 1745, 1758, 1766, 1786, 2152, 2168, 2170
\ignorespaces 324, 501, 514, 1569, 1773, 2139
\immediate 391
\includecomment 2154, 2158, 2164
\includegraphics 1422, 1427, 1509, 1521, 1533, 1548
\indent 2120
\institution . . . *10*, 1567
\interfootnotelinepenalty 495
\interlinepenalty 281, 332, 495
\item 2138
\itemindent 614
\itshape . . 1296, 2001, 2002, 2031, 2036, 2049, 2061, 2081, 2129

K

\kern 472, 473, 477, 478, 1554
\keywords *13*, 1003

L

\labelenumi 605
\labelenumii 606
\labelenumiii 607
\labelenumiv 608
\labelsep 612, 2138
\labelwidth 615
\LARGE 1457, 1459, 1461, 1484, 1486, 1488, 1490, 1492, 1619, 1622, 1937
\Large 1610, 1628, 2014, 2015, 2017, 2018, 2020
\large 1615, 1620, 1623, 2008, 2009, 2011, 2012
\lastbox 313
\leaders 1554
\leavevmode 254, 1554, 1719
\leftskip . 1553, 1753, 1997
\let 189, 191, 203, 205, 207, 233, 271, 338, 339, 371, 372, 373, 374, 375, 376, 377, 380, 579, 615, 619, 1059, 1269, 1270, 1284, 1285, 1288, 1356, 1357, 1568, 1571, 1572, 1573, 1574, 1575, 1581, 1582, 1584, 1648, 1665, 1715, 1721, 1750, 1755
\lineskip 1720, 1754
\list 613
\LoadClass 151
\long 493, 504, 567, 570, 573, 1006, 1008, 1254, 1813
\loop 1820, 1922

M

\makebox 1931
\makelabel 615
\maketitle *15*, 1263
\MakeUppercase 1651, 1653, 1999, 2008, 2011, 2014, 2017, 2039, 2043
\marginfigure 569
marginfigure (environment) *17*
\marginpar 493, 568, 571, 574, 1419
\marginparsep . . 576, 1897

\marginparwidth . 576, 1897
\margintable 572
margintable (environment) 17
\mbox 211
\mdseries 1478, 1480, 1482, 1486, 1488, 1490, 1492, 1494, 1632, 1635
\medskip 1370, 1372, 1374, 1376, 1666, 1668, 1719, 1762, 1777, 1792, 1795, 1797, 1799
\mktitle@bx 1262, 1398, 1401, 1404, 1407, 1409, 1411, 1413, 1415, 1417, 1506, 1525, 1553, 1666, 1718, 1719, 1761
\moveleft 593
\multiply 1928

N

\NAT@@setcites 229
\NAT@aysep 220
\NAT@citetp 380
\NAT@close 169, 171, 173, 175, 218
\NAT@cmprs . . 197, 199, 201
\NAT@cmt 224
\NAT@ctype 380
\NAT@find@eq 212
\NAT@fullfalse 380
\NAT@longnamestrue . 209
\NAT@merge . . 203, 205, 207
\NAT@nmfmt 211
\NAT@numbersfalse . . 183
\NAT@numberstrue 185, 187
\NAT@open 169, 171, 173, 175, 216, 380
\NAT@partrue 380
\NAT@rem@eq 214
\NAT@sep 177, 179, 181, 226
\NAT@sort . . . 193, 195, 201
\NAT@superfalse 185
\NAT@supertrue 187
\NAT@swafalse 379
\NAT@up 211
\NAT@yrsep 222
\NeedsTeXFormat 1
\newblock 381
\newbox . . 1262, 1560, 1670
\newcommand 239, 245, 872, 925, 989, 994, 1039, 1060, 1570, 1579, 2151, 2166
\newcount 884
\newdimen 575, 1671, 1901, 1903, 1905
\newenvironment 569, 572, 1253
\newfloat 564
\newif 68, 95, 96, 97, 517, 982, 1071, 1073, 1075
\newlength 984, 986, 987, 1818
\newsavebox 1816
\newskip 1672
\newtheorem 2110, 2111, 2112, 2113, 2114, 2116, 2117
\newtheoremstyle 2068, 2098
\nobreak 304, 1777
\noindent 491, 1055, 1285, 1370, 1372, 1374, 1376, 1395, 1399, 1402, 1405, 1419, 1506, 1513, 1516, 1540, 1554, 1555, 1557, 1638, 1666, 1667, 1718, 1754, 1761, 1762, 1769, 1777, 1778, 1790, 1795, 1797, 1799, 2130
\nolinkurl 1325, 1329, 1706, 1708, 1741, 1743, 1790
\normalcolor 484
\normalfont 516, 1055, 1280, 1611, 1616, 1625, 1626, 1628, 1629, 2064, 2079, 2091, 2094, 2136, 2173
\normalsize 1611, 1625, 1626, 1629, 2173
\num@authorgroups 884, 888, 1266, 1684, 1688, 1690, 1725
\numberline 286, 296

O

\onehalfspacing 157
\or 107, 109, 111, 113, 115, 117, 119, 121, 132, 134, 136, 138, 140, 142, 144, 146, 350, 351, 352, 353, 354, 355, 357, 358, 406, 412, 418, 424, 430, 436, 442, 448, 462, 463, 464, 466, 467, 468, 469, 470, 547, 548, 549, 550, 551, 553, 556, 559, 599, 600, 601, 602, 603, 604, 609, 610, 676, 680, 685, 689, 693, 697, 701, 705, 708, 712, 716, 720, 722, 726, 730, 732, 734, 736, 740, 744, 748, 752, 756, 760, 764, 768, 772, 776, 780, 784, 788, 792, 796, 800, 804, 809, 813, 817, 821, 825, 829, 833, 837, 841, 845, 849, 853, 857, 972, 973, 974, 1119, 1121, 1124, 1126, 1127, 1129, 1131, 1133, 1136, 1139, 1141, 1148, 1159, 1170, 1178, 1184, 1196, 1210, 1222, 1229, 1236, 1242, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1400, 1403, 1406, 1408, 1410, 1412, 1414, 1416, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472,

1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1614, 1617, 1618, 1621, 1624, 1627, 1630, 1633, 1686, 1687, 1689, 1691, 1727, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1836, 1838, 1840, 1842, 1844, 1846, 1848, 1850, 1864, 1871, 1879, 1910, 1915, 1949, 1957, 1965, 2006, 2007, 2010, 2013, 2016, 2019, 2037, 2041, 2055, 2056, 2057, 2058, 2059, 2060, 2065, 2066, 2085, 2086, 2087, 2088, 2089, 2090, 2095, 2096, 2123, 2124, 2125, 2126, 2127, 2128, 2131, 2132
\orcid *9*, 934
\outer@nobreak 590

P

\p@ 458, 465, 472, 473, 477, 478, 614, 1976, 1980, 1984, 1985, 1988, 1989, 1992, 1993, 2023, 2028, 2029, 2033, 2034, 2136
\PackageError 49, 57, 65, 76, 83
\PackageInfo 46, 48, 54, 56, 62, 64, 73, 75, 80, 82
\PageIndex 16
\pagestyle 1900
\par 255, 304, 480, 588, 1055, 1288, 1292, 1296, 1339, 1344, 1352, 1370, 1372, 1374, 1376, 1398, 1399, 1401, 1402, 1404, 1405, 1417, 1516, 1523, 1540, 1551, 1554, 1557, 1559, 1577, 1578, 1579, 1580, 1638, 1642, 1666, 1668, 1674, 1676, 1700, 1702, 1708, 1713, 1719, 1721, 1735, 1737, 1743, 1748, 1753, 1755, 1759, 1760, 1761, 1762, 1773, 1777, 1789, 1791, 1792, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1813, 2134
\paragraph 1382, 1987, 2027
\parbox . . . 1512, 1530, 1537, 1545, 1817, 1935
\parindent 458, 1288, 1290, 1987, 1998, 2050, 2080
\parskip 458, 1290
\part 1991
\PassOptionsToClass 91, 92
\pdfstringdefDisableCommands 341
\phantomsection 163, 1767, 2146
\popQED 2141
\position *10*, 1567
\postcode *10*, 1567
printonly (environment) *17*
\ProcessOptionsX 93
\proof 2134
\proofname 2134
\protect 286, 296
\protected@edef 274, 496, 510
\providecommand 381, 383, 2048
\ProvidesClass 5
\ProvidesFile 3
\pushQED 2135
\put 1828

Q

\qed 2135
\quad 325, 1873, 1876, 1881, 1884

R

\raggedright 1512, 1553, 1753
\raisebox . . 1508, 1520, 1532, 1547, 1931, 1933
\received *15*, 1039
\RecordChanges 18
\ref 1782, 1788
\refname 162, 163
\refstepcounter 273
\relax 98, 105, 130, 212, 213, 256, 274, 276, 280, 291, 302, 317, 327, 335, 349, 404, 461, 546, 598, 672, 885, 888, 1064, 1084, 1089, 1092, 1095, 1100, 1103, 1106, 1109, 1112, 1118, 1147, 1284, 1369, 1397, 1434, 1456, 1477, 1589, 1613, 1673, 1682, 1683, 1685, 1688, 1690, 1692, 1694, 1696, 1720, 1723, 1724, 1726, 1729, 1731, 1794, 1819, 1834, 1858, 1909, 1911, 1912, 1913, 1916, 1917, 1918, 1921, 1923, 1926, 1927, 1928, 1929, 1945, 2005, 2054, 2084, 2122, 2136
\renewcommand . . 161, 165, 166, 169, 171, 173, 175, 177, 179, 181, 231, 534, 612, 886, 930, 1255, 1271, 1855, 1856, 1942, 1943, 1975, 1979, 1983, 1987, 1991, 2022, 2027, 2032

\renewenvironment . . . 566, 613, 1005, 2134
\repeat 1823, 1925
\RequirePackage 26, 152, 153, 154, 156, 160, 340, 393, 402, 474, 528, 529, 530, 531, 536, 1057, 1062, 1814
\reset@font 494, 507
\reversemarginpar . . 456
\rightskip 1996
\rlap 1932
\rule 501, 514, 1934

S

\savebox 1817
screenonly (environment) *17*
\scriptsize 1820
\scshape 2051, 2119
\section 162, 1378, 1380, 1384, 1386, 1771, 1975, 2145
\section@raggedright 1995, 1999, 2000, 2008, 2009, 2011, 2012, 2014, 2015, 2017, 2018, 2020, 2021, 2026, 2039, 2040, 2043, 2044
\SelectFootnoteRule 475
\setbox 313, 505, 593, 1506, 1525, 1553, 1563, 1666, 1675, 1718, 1761
\setcitestyle *19*, 166, 240, 246
\setcopyright . . *14*, 1115
\setcounter 1279, 1334, 1392, 2003, 2038, 2042
\setkeys 33, 866, 1027, 1115
\setlength 458, 459, 465, 985, 988, 1818
\settopmatter *15*, 1027, 1028, 1030, 1033, 1035
\sfdefault 534
\sffamily . . 1457, 1459, 1461, 1463, 1465, 1467, 1471, 1610, 1615, 1619, 1835, 1837, 1839, 1841, 1843, 1845, 1847, 1849, 1851, 1937, 1999, 2000, 2001, 2008, 2009, 2011, 2012, 2017, 2018, 2039, 2040, 2043, 2044
\shortauthors *15*, 906, 907, 912, 913, 915, 918, 919, 921, 1355, 1357, 1831
\shortcite 385
\shorttitle 1862, 1868, 1876, 1884, 1889
\showeprint 2166
\sidebar 564
sidebar (environment) . *17*
\skip 483
\small . . 494, 568, 571, 574, 1055, 1370, 1372, 1374, 1376, 1616, 1769, 1777, 1947
\space 1583, 2152
\specialcomment 2143
\standardpagestyle . 1853
\startPage *13*, 999
\state *10*, 1567
\stepcounter 939, 941, 948, 951, 958
\streetaddress . *10*, 1567
\string 391
\strut 1530, 1545
\strutbox 501, 514
\subparagraph 2032
\subsection 1979
\subsubsection 1983, 2022
\subtitle *9*, 882
\subtitlenote . . . *11*, 944

T

\teaserfigure 1253
teaserfigure (environment) *14*
\terms *13*, 1001
\textbf 1065, 1068
\textbullet 343, 1065, 1873, 1876, 1881, 1884
\textcolor 1937
\textheight 1823
\textit . . 1069, 1780, 1784
\textrightarrow . 344, 1065
\textwidth 576, 594, 595, 1274, 1496, 1524, 1552, 1587, 1682, 1717
\thanks *11*, 1255, 1813
\thankses 1258, 1260, 1286, 1813
\the 1820, 1928
\theenumi 605
\theenumii 606
\theenumiii 607
\theenumiv 608
\thefootnote 1271
\theoremstyle 2109, 2115, 2118
\thepage 1859, 1860, 1865, 1866, 1873, 1876, 1881, 1884, 1888, 1947, 1972
\thispagestyle 1394
\thmname 2078, 2108
\thmnote 2078, 2108
\thmnumber 2078, 2108
\thr@@ 207
\title *7*
\titlenote *11*, 935
\topsep 2136
\trivlist 2137
\tw@ 205
\twocolumn 1407, 1409, 1411, 1413, 1415

U

\unskip 316, 342, 481, 1564, 1583, 1642
\unvbox 485, 490, 506
\upshape 612
\url 1145, 2152
\urlstyle . . . 347, 356, 359
\usebox 1828
\usepackage 10, 11, 12, 13, 14, 15

V

\vbox 505, 593, 1506, 1525, 1553, 1666, 1718, 1761
\vskip 305, 483, 588
\vtop 1675

W

\wd 595, 1564
\write 391

X

\xdef 216, 218, 220, 222, 224, 226

Z

\z@ 195, 258, 277, 303, 313, 328, 459, 501, 514, 540, 544, 555, 615, 1272, 1288, 1290, 1508, 1520, 1532, 1547, 1753, 1855, 1856, 1902, 1904, 1906, 1931, 1933, 1942, 1943, 1975, 1979, 1991, 1998, 2022, 2027, 2032, 2062, 2092
\z@skip 588, 1997