Lass for the Association for Computing Machinery*

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Abstract

This package provides a class for type setting publications of the Association for Computing Machinery.

Contents

1	Intr	oduction	3
2	User	r's guide	3
	2.1	Installation	3
	2.2	Invocation and options	6
	2.3	Top matter	7
	2.4	Top matter of ACM Engage materials	19
	2.5	ACM cover page	20
	2.6	Internationalization	21
	2.7	Algorithms	22
	2.8	Figures and tables	22
	2.9	Descriptions of images	23
	2.10	Theorems	23
	2.11	Online-only and offline-only material	24
	2.12		24
	2.13		25
	2.14	Bibliography	25
		2.14.1 Processing using BibTeX	25
		2.14.2 Processing using BibLATeX	29
	2.15	Colors	29
		2.15.1 Manual bibliography	30
	2.16	Other notable packages and typographic remarks	30
		Counting words	31
		Creative Commons licenses for ACM publications	31
	2.19	Disabled or forbidden commands	31
	2.20		32
	2.21	Currently supported publications	32
		A note about sigchi-a format	34

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3	Imp	lementation	36
	3.1	Identification	36
	3.2	Preload hook	36
	3.3	Options	36
	3.4	Setting switches	40
	3.5	Loading the base class and package	41
	3.6	Citations	42
	3.7	Internationalization	44
	3.8	Sectioning	46
	3.9	Hyperxmp and hyperref	49
	3.10	Other packages	51
	3.11	Paper size and paragraphing	51
	3.12	Fonts	55
	3.13	Image descriptions	56
	3.14	Floats	57
	3.15	Lists	59
	3.16	Top-matter data	60
	3.17	Concepts system	77
	3.18	Copyright system	78
	3.19	Maketitle hook	84
	3.20	ACM Engage top matter	84
	3.21	Typesetting top matter	84
	3.22	Headers and Footers	100
	3.23	Sectioning	106
	3.24	TOC lists	109
	3.25	Theorems	109
	3.26	Balancing columns	112
	3.27	Acknowledgments	113
	3.28	Conditional typesetting	114
	3.29	Additional bibliography commands	114
	3.30	Index	114
	3 31	End of Class	114

1 Introduction

The Association for Computing Machinery¹ is the world's largest educational and scientific computing society, which delivers resources that advance computing as a science and a profession. It was one of the early adopters of TeX for its typesetting.

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

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

This 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 this package.

I am grateful to Michael D. Adams, Leif Andersen, Lawrence Christopher Angrave, Dirk Beyer, Andrew Black, Joachim Breitner, Yegor Bugayenko, Benjamin Byholm, John Collins, Roberto Di Cosmo, Nils Anders Danielsson, Michael Ekstrand, Matthew Fluet, Paolo G. Giarrusso, Ben Greenman, Enrico Gregorio, Jamie Davis, Ulrike Fischer, Jason Hemann, Peter Kemp, Luis Leiva, Ben Liblit, Rholais Lii, LianTze Lim, Kuldeep S. Meel, Kai Mindermann, Frank Mittelbach, Serguei Mokhov, Ross Moore, John Owens, Joel Nider, Scott Pakin, Tobias Pape, Henning Pohl, Philip Quinn, Mathias Rav, Andreas Reichinger, Matteo Riondato, Craig Rodkin, Bernard Rous, Feras Saad, Kerry A. Seitz, Jr., David Shamma, Gabriel Scherer, Kartik Singhal, Christoph Sommer, Stephen Spencer, Shin Hwei Tan, Daniel Thomas, Shari Trewin, Zack Weinberg, John Wickerson 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

This class uses many commands and customizaton options, so it might appear intimidating for a casual user. Do not panic! Many of these commands and options can be safely left with their default values or the values recommended by your conference or journal editors. If you have problems or questions, do not hesitate to ask me directly or the community at https://github.com/borisveytsman/acmart, https://tex.stackexchange.com or the closest TeX Users Group. The world-wide TeX Users Group is at https://tug.org/; please consider joining us if you use TeX regularly.

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 this package uses a number of relatively recent packages, especially the ones related to fonts.

The latest released version of this package can be found on CTAN: https://www.ctan.org/pkg/acmart. The development version can be found on GitHub: https://github.com/borisveytsman/acmart. At this address you can file a bug report—or even contribute your own enhancement by making a pull request.

¹http://www.acm.org/

Please note that the version on Github is a development (or experimental) version: please download it for testing new features. The production version is the one on CTAN and ACM sites.

Most users should not attempt to install this package themselves but should rather rely on their TEX distributions to provide it. If you decide to install the package yourself, follow the standard rules:

- 1. Run latex acmart.ins. This will produce the file acmart.cls
- 2. Put the files acmart.cls, acm-jdslogo.png, and ACM-Reference-Format.bst in 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 probably the file you are 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.

This 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
- amsfonts, http://www.ctan.org/pkg/amsfonts
- amsmath, http://www.ctan.org/pkg/amsmath
- binhex, http://www.ctan.org/pkg/binhex
- balance, http://www.ctan.org/pkg/balance
- booktabs, http://www.ctan.org/pkg/booktabs
- caption, http://www.ctan.org/pkg/caption
- comment, http://www.ctan.org/pkg/comment
- cm-super, http://www.ctan.org/pkg/cm-super
- cmap, http://www.ctan.org/pkg/cmap
- doclicense, http://www.ctan.org/pkg/doclicense
- draftwatermark, http://www.ctan.org/pkg/draftwatermark
- environ, http://www.ctan.org/pkg/environ
- etoolbox, http://www.ctan.org/pkg/etoolbox
- 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
- *hyperxmp*, http://www.ctan.org/pkg/hyperxmp
- *iftex*, http://www.ctan.org/pkg/iftex
- *inconsolata*, http://www.ctan.org/pkg/inconsolata
- *libertine*, http://www.ctan.org/pkg/libertine
- manyfoot, http://www.ctan.org/pkg/manyfoot
- *microtype*, http://www.ctan.org/pkg/microtype
- mmap, http://www.ctan.org/pkg/mmap
- *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
- refcount, http://www.ctan.org/pkg/refcount
- *setspace*, http://www.ctan.org/pkg/setspace
- *textcase*, http://www.ctan.org/pkg/textcase
- 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
- xstring, http://www.ctan.org/pkg/xstring

2.2 Invocation and options

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

```
\documentclass[\langle options \rangle] \{ 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, transactions, and course materials, while formats starting with sig are intended for proceedings published as books.

Note that sometimes conference proceedings are published as a special issue (or issues) of an ACM journal. In this case, you should use the journal format for a conference paper. Please contact your conference committee if in doubt.

Starting in 2020, ACM retired formats sigchi and sigchi-a. SIGCHI conferences now use sigconf format for their publications. If a file uses sigchi format, a warning is issued, and the format is automatically switched to sigconf. Format sigchi-a can be used for non-ACM documents only (see Section 2.22). The format acmcp is used for ACM cover pages discussed in Section 2.5.

There are several Boolean options that can take true or false values. They are listed in Table 2. The words =true can be omitted when setting a 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 copy editors.

Two samples in the samples directory, manuscript and acmsmall-submission, show manuscripts formatted for submission to ACM.

The default for the option screen depends on the publication. At present it is false for all publications *but* PACM, since PACM is now electronic-only. Thus PACM titles (see Table 5) set this option to true. In the future this option may involve additional features suitable for on-screen versions of articles.

The option natbib is used when the corresponding $\mbox{BibT}_{\!\! E} \mbox{X}$ style is based on natbib. In most cases you do not need to set it. See Section 2.14.

The option anonymous is used for anonymous review processes and causes all author information to be 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 ACMJCSS, CIE, CSUR, DLT,
	FAC, GAMES, JACM, JATS, JDIQ, JDS, JEA, JERIC, JETC, JRC, PACM-
	CGIT, PACMHCI, PACMMOD, PACMNET, PACMPL, PACMSE, PO-
	MACS, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP),
	TCPS, TDS, TEAC, TECS, TELO, THRI, TIIS, TIOT, TISSEC, TIST,
	TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS,
	TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS,
	TOMS, TOPC, TOPLAS, TOPML, TOPS, TORS TOS, TOSEM, TOSN,
	TQC, TRETS, TSAS, TSC, TSLP, and TWEB, including special issues.
acmlarge	Large single-column format. Used for DTRAP, HEALTH, IMWUT,
	JOCCH, and TAP, including special issues.
acmtog	Large double-column format. Used for TOG, including annual confer-
	ence Technical Papers.
sigconf	Proceedings format for most ACM conferences (with the exception of
	SIGPIAN) and all ICPS volumes.
sigplan	Proceedings format for SIGPLAN conferences.
acmengage	ACM EngageCSEdu Course materials.
acmcp	ACM cover page.

The option timestamp is used to include a time stamp in the footer of each page. When preparing a document, this can help avoid confusing different revisions. The footer also includes the page range of the document. This helps detect missing pages in hard copies.

The option authordraft is intended for author's drafts that are not intended for distribution. It typesets a copyright block to give the author an idea of its size and the overall size of the paper but overprints it with the phrase "Unpublished working draft. Not for distribution.", which is also used as a watermark. This option sets timestamp and review to true, but these can be overriden by setting these options to false *after* setting authordraft to true.

The option balance determines whether the last page in the two column mode has balanced columns. By default it is true; however, it may lead to problems for some documents. Set it to false if you encounter compilation errors. Note that for one page documents \balance command might cause problems. An alternative is the (experimental) option pbalance, which uses the new package pbalance for this end.

The option urlbreakonhyphens determines whether URLs can be split between lines after hyphens. By default it is true. Set it to false to disallow these breaks.

The option language is used to define the languages for the multi-language papers. It is discussed in Section 2.6.

2.3 Top matter

A number of commands set up *top matter* or (in computer science jargon) *metadata* for an article. They establish the publication name, article title, authors, DOI and other data. Some of these commands, like \title and \author, should be put by the authors.

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered and hyperlinks are colored
screen	see text	A screen version: hyperlinks are colored
natbib	true	Whether to use the natbib package (see Section 2.14)
anonymous	false	Whether to make author(s) anonymous
authorversion	false	Whether to generate a special version for the authors' personal use or posting (see Section 2.3)
nonacm	false	Use the class typesetting options for a non-ACM document, which will not include the conference/journal header and footers. Currenly such documents allow only a Creative Commons license.
timestamp	false	Whether to put a time stamp in the footer of each page
authordraft	false	Whether author's-draft mode is enabled
acmthm	true	Whether to define theorem-like environments, see Section 2.10
balance	true	Whether to balance the last page in two column mode
pbalance	false	Whether to balance the last page in two column mode using phalance package
urlbreakonhyphens	true	Whether to break urls on hyphens

Others, like \acmVolume and \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 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.

This class internally loads the amsart class, so many top-matter commands are inherited from amsart [2].

\acmJournal

The macro $\armontomath{\armontenant{armsaction}} \{\armontenant{sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication in uppercase, for example,$

```
\acmJournal{TOMS}
```

The currently recognized journals are listed in Table 5. Note that conference proceedings published in *book* form do not set this macro.

\acmConference

The macro \acmConference[$\langle short\ name \rangle$]{ $\langle name \rangle$ }{ $\langle date \rangle$ }{ $\langle venue \rangle$ } 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.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}
```

\acmBooktitle

By default we assume that conference proceedings are published in the book named *Proceedings of CONFERENCE*, where CONFERENCE is the name of the conference inferred from the command \acmConference above. However, sometimes the book title is different. The command \acmBooktitle can be used to set this title, for example,

```
\acmBooktitle{Companion to the first International Conference on the
Art, Science and Engineering of Programming (Programming '17)}
```

An ACM paper should have either \acmJournal or \acmConference command. If it has both (or more) commands, the last one takes precedence. Note that if you have the command \acmConference in a journal format like acmsmall, the class will use conference format for bibstrip and reference citation formatting. In the samples directory there is a file sample-acmsmall-conf. tex with the example of this usage.

An ACM Engage material should *not* use \acmJournal or \acmConference command. It may use \acmBooktitle to override the default *ACM EngageCSEdu*. It should use \acmYear to set the date of the material.

\editor

In most cases, conference proceedings are edited. You can use the command $\ensuremath{\mbox{\mbox{\mbox{ommand}}}}$ to set the editor of the volume. This command can be repeated, for example,

```
\editor{Jennifer B. Sartor}
```

```
\editor{Theo D'Hondt}
\editor{Wolfgang De Meuter}
```

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

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

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.

\subtitle

Besides title, ACM classes allow a subtitle, set with the \subtitle{\langle subtitle}} macro.

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

\email

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

Do *not* use the Lack and macro or commas, or \\ between the authors! Each author deserves his or her own \author command. An attempt to list several authors or their emails in one command leads to a warning or an error. This is not a bug, but the expected behavior.

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

ACM strongly encourages that you include ORCIDs for all authors before compiling or submitting for review and/or production processing.

If you do not have an ORCID, you may get one for free by registering at http://www.orcid.org/.

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

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

Similarly you can repeat the \email command.

You may have several authors with the same affiliation, 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, author A_3 is affiliated with I_1 and I_3 , etc.). 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{...}
\operatorname{\colong}
\affiliation{...}
\affiliation{...}
\email{...}
```

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

```
\author{...}
\ensuremath{\mbox{\mbox{email}}\{\dots\}}
\author{...}
\ensuremath{\mbox{\mbox{email}}\{\dots\}}
\affiliation{...}
```

However, this format is not generally recommended.

\additionalaffiliation

In some cases, too many affiliations can take too much space. The command \additionalaffiliation{\affiliation\} creates a footnote after an author's name with the words "Also with $\{\langle affiliation \rangle\}$ ". You should use this command only as a last resort. An example of usage is:

```
\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \int Th{ \pi } Th{ \sigma}rv{ \array} d Group}
  \streetaddress{1 Th{\o}rv{\"a}ld Circle}
  \city{Hekla}
  \country{Iceland}}
\affiliation{%
  \institution{Institute for Clarity in Documentation}
  \streetaddress{P.O. Box 1212}
  \city{Dublin}
  \state{Ohio}
  \postcode{43017-6221}}
```

Here Trovato and Tobin share their affiliation with the Institute for Clarity in Documentation, but only Ben Trovato is affiliated with The Thørväld Group.

\position \streetaddress

The \affiliation and \additional affiliation commands are further structured \institution to interact with the metadata extraction tools. Inside these commands you should use the \department \position, \institution, \department, \city, \streetaddress, \state, \postcode

\city \state \postcode \country 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.

The fields \institution, \city and \country are mandatory. If they are not provided, an error or a warning is issued. Currently the absence of \country produces an error; ACM may change this in the future.

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 the old ACM conference formats did not allow more than six authors and required some effort from 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 in the John Doe Institute!
  \department{John Doe Institute}
  \institution{University of San Serriffe}
  \country{San Serriffe}}
```

The command \affiliation formats its output according to American conventions. This might be wrong for some cases. Consider, for example, a German address. In Germany, the postcode is put before the city and is not separated by a comma. We can handle this order using

```
\affiliation{%
  \institution{Fluginstitut}
  \streetaddress{Sonnenallee 17}
  \postcode{123456}
  \city{Helm}
  \country{Germany}}
```

However, the comma after the postcode is unfortunate: the address will be typeset (in some formats) as

```
Fluginstitut
Sonenallee 17
123456, Helm, Germany
```

To overcome this problem, the command \affiliation has an optional parameter obeypunctuation, which can be false (the default) or true. If this parameter is true, \afffiliation obeys the author's command. Thus

```
\affiliation[obeypunctuation=true]{%
  \institution{Fluginstitut}\\
  \streetaddress{Sonnenallee 17}\\
  \postcode{123456}
  \city{Helm},
  \country{Germany}}

will be typeset as
Fluginstitut
Sonenallee 17
123456 Helm, Germany
```

Note that you should *not* use this option for journals.

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 the commands \title and \author. This command is obsolete and should *not* be used in most

cases. Do not list your acknowledgments or grant sponsors here. Put this information in the acks environment (see Section 2.13).

\authorsaddresses

In some formats, addresses are printed as a footnote on the first page. By default LATEX typesets them itself using the information you give it. However, you can override its choice using the command \authorsaddresses{ \(\contact addresses \) \}, for example,

```
\authorsaddresses{%
Authors' addresses: G.~Zhou, Computer Science Department, College of
William and Mary, 104 Jameson Rd, Williamsburg, PA 23185, US;
V.~B\'eranger, Inria Paris-Rocquencourt, Rocquencourt, France;
A.~Patel, Rajiv Gandhi University, Rono-Hills, Doimukh, Arunachal
Pradesh, India; H. ~Chan, Tsinghua University, 30 Shuangqing Rd,
Haidian Qu, Beijing Shi, China; T.~Yan, Eaton Innovation Center,
Prague, Czech Republic; T.~He, C.~Huang, J.~A.~Stankovic University
of Virginia, School of Engineering Charlottesville, VA 22903, USA;
T. F. Abdelzaher, (Current address) NASA Ames Research Center,
Moffett Field, California 94035.}
```

You can suppress printing authors' addresses by setting them to an empty string: \authorsaddresses{}. Please note that authors' addresses are mandatory for journal articles.

\titlenote

While the command \thanks generates a note without a footnote mark, sometimes \subtitlenote the authors might need notes more tightly connected to the title, subtitle or author. The \authornote 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}
```

\authornotemark

Please never use a \footnote inside an \author or \title command since this confuses the metadata extraction software. (Actually these commands now produce errors.) Sometimes one may need to have the same footnote connected to several authors. The command \authornotemark[$\langle number \rangle$] adds just the footnote mark, for example,

```
\author{A. U. Thor}
\authornote{Both authors contributed equally to the paper}
\author{A. N. Other}
\authornotemark[1]
```

The correct numbering of these marks is the responsibility of the user.

\acmVolume \acmMonth

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

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

```
\acmMonth{3}
```

Note that \acmArticle is used not only for journals but also for some conference proceedings.

\acmArticleSeq

The articles in the same issue of a journal have a sequence number. By default it is the same as the article number, but the command $\acmArticleSeq\{\langle n\rangle\}\$ can be used to change it:

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

\acmSubmissionID

If your paper got a Submission ID from the Conference Management System, put it here:

```
\acmSubmissionID{123-A56-BU3}
```

\acmISBN

Book-like volumes have ISBN numbers attached to them. The macro $\acmission acmission (ISBN)$ sets it. Normally it is set by the typesetter, for example,

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

Setting it to the empty string, as \acmISBN{}, suppresses printing the ISBN.

\acmD0I The macro $\acmDOI\{\langle DOI \rangle\}$ sets the DOI of the article, for example,

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

It is normally set by the typesetter. Setting it to the empty string, as \acmDOI{}, suppresses the DOI.

\acmBadge

Some conference articles get special distinctions, 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. This class provides command to add these badges: $\acmBadge[\langle url \rangle] \{\langle graphics \rangle\}$. The arguments have the following meaning: $[\langle url \rangle]$, if provided, sets the link to the badge authority in the screen version, while $\{\langle graphics \rangle\}$ 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}
```

The command can be repeated, if a paper has several badges.

\startPage

The macro $\mathsf{startPage}(\mathsf{page})$ sets the first page of the article in a journal or book. It is used by the typesetter.

\terms

The command \keywords $\{\langle keyword, keyword, ... \rangle\}$ sets keywords for the article. \keywords They must be separated by commas, for example,

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

CCSXML (env.) ACM publications are classified according to the ACM Computing Classification \ccsdesc Scheme (CCS). CCS codes are used both in the typeset version of the publications and in the metadata in 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 results 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>
</cs2012>
\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 just need to copy this code and paste it in your paper anywhere before \maketitle.

CCS Concepts and user-defined keywords are required for all articles over two pages in length, and are optional for one- and two-page articles (or abstracts).

\setcopyright

There are several possibilities for the copyright of the papers published by the ACM: the authors may license the paper to the ACM, some or all authors might be employees of the US or Canadian governments, 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 3. This command must be placed in the preamble, before \begin{document}. Additional information about ACM copyright rules is discussed in Section 2.18.

\setcctype

If Creative Commons license is used, the package by default chooses CC-BY 4.0 Attribution 4.0 International license. You can override this choice by the command $\setcctype[\langle version \rangle] \{\langle type \rangle\}$, where $[\langle version \rangle]$ can be either 3.0 or 4.0 (4.0 by de-

Table 3: Parameters for the \backslash setcopyright command

Parameter	Meaning
none	The copyright and permission information is not typeset.
	(This is the option for some ACM conferences.)
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.
licensedusgovmixed	Some authors are employees of the US government, and the publication rights are licensed to ACM.
licensedcagov	All the authors are employees of the Canadian government, and the publication rights are licensed to ACM.
licensedcagovmixed	Some authors are employees of the Canadian government, and the publication rights are licensed to ACM.
othergov	Authors are employees of a government other than the US or Canada.
licensedothergov	Authors are employees of a government other than the US or Canada, and the publication rights are licensed to ACM.
iw3c2w3	Special statement for conferences organized by IW3C2.
iw3c2w3g	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.
cc	Creative Commons license. If this key is set, <i>doclicense</i> images are used to typeset the license. See also \setcctype command. Note that at present this license can be used only either for acmengage format, or for nonacm publications, or for the authors that meet any of the following requirements: (a) part of the ACM Open Program; (b) publishing in a Gold Open Access publication; (c) paying the Open Access APC;
acmcopyright	(d) part of the Google publishing agreement. The authors transfer the copyright to the ACM. This choice is no longer available for the non-commissioned authors and will trigger a warning.

fault), and $\{\langle type \rangle\}$ can be one of zero, by, by-sa, by-nd, by-nc, by-nc-sa, by-nc-nd (see https://creativecommons.org/licenses/ for the explanation). This command should be used in the preamble only.

Material published under Creative Commons license should include the corresponding icon. A modern TeX distribution includes these icons in the package *doclicense*. In case your distribution does not have them, ACM provides a file ccicons. Zip with these icons. Just unzip it in the same directory where your document is.

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 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 a 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 (env.)

The environment abstract must *precede* the \maketitle command. Again, this is different from the standard LTEX. Putting abstract after \maketitle will trigger an error.

teaserfigure (env.)

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,

```
\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 can override these defaults using the command $\texttt{settopmatter}\{\langle settings \rangle\}$. The settings and their meanings are listed in Table 4. For example,

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

The parameter authorsperrow requires some explanation. In conference proceedings authors' information is typeset in boxes, several boxes per row (see sample-sigconf.pdf, sample-sigplan.pdf, etc.). The number of boxes per row is determined automatically. If you want to override this, you can do it using this parameter, for example,

```
\settopmatter{authorsperrow=4}
```

Table 4: Settings for the \settopmatter command

Parameter	Values	Meaning
printccs printacmref printfolios authorsperrow	true/false true/false true/false numeric	Whether to print CCS categories Whether to print the ACM bibliographic entry Whether to print page numbers (folios) Number of authors per row for the title page in conference proceedings formats

However, in most cases you should *not* do this and should use the default settings. Setting authorsperrow to 0 will revert it to the default settings.

The parameter printacmref specifies whether to print the ACM bibliographic entry (default), or not. Note that this entry is required for all articles over one page in length, and is optional for one-page articles (abstracts).

\received

The command $\received[\langle stage \rangle] \{\langle date \rangle\}$ sets the history of the publication. The $[\langle stage \rangle]$ argument is optional; the default is Received for the first date and revised for the subsequent ones. For example,

```
\received{20 February 2007}
\received[revised]{12 March 2009}
\received[accepted]{5 June 2009}
```

\maketitle

The macro \maketitle must be the last command in the top-matter group. That is 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 can redefine it if the list of author's name is too long, e.g.,

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

2.4 Top matter of ACM Engage materials

ACM Engage materials resemble conference proceedings, but have some special features. First, as a rule, they are released under a Creative Commons license. By default CC-BY is used. However, if you want to use another variant of CC license, use \setcctype command, for example, \setcctype{by-nc}. Second, abstract is called synopsis. Third, there are special top matter items used for the materials, such as Course, Resource Type, Programming Language, CS Topics.

\setengagemetadata

These items are set with the command \setengagemetadata $\{\langle name \rangle\}\{\langle value \rangle\}$, for example,

```
\setengagemetadata{Course}{CS1}
\setengagemetadata{Programming Language}{Python}
\setengagemetadata{Knowledge Unit}{Programming Concepts}
\setengagemetadata{CS Topics}{Functions, Data Types, Expressions,
Mathematical Reasoning}
```

Note that the type of Creative Commons license, if such license is used, is automatically added to the metadata.

2.5 ACM cover page

ACM cover pages are forms of extended abstracts that are added to journals at the late stage. Authors prepare them as separate . tex files using acmcp format. At present only JDS uses them, but in the future this may change.

There are several top matter commands specific for this format.

\acmArticleType

There are five article types accepted by JDS: Research (the default), Review, Discussion, Invited, and Position. The command $\acmArticleType\{\langle type\rangle\}\$ sets the article type, for example

```
\acmArticleType{Review}
```

\acmCodeLink The commands \acmCodeDataLink{ $\langle link \rangle$ } and \acmDataLink{ $\langle link \rangle$ } set the links \acmDataLink to the data and code accompanying the paper, for example,

```
\acmCodeLink{https://github.com/repository/code}
\acmDataLink{https://datadryad.org/stash/dataset/doi:DOI}
```

You may repeat these commands if you have several repositories.

 \acmContributions The command $\acmContributions{\langle contributions \rangle}$ sets the contributions of the authors, for example,

```
\label{lem:contributions} $$ AW designed the study, CD performed it, all authors contributed to the writing.$$
```

ACM cover page should have the following obligatory sections:

- · Problem statement,
- · Methods,
- · Results,
- · Significance.

Sometimes the addresses extracted from the authors' data are too long to fit on the page. In this case the command \authorsaddresses can be use to override them, for example,

```
\authorsaddresses{Corresponding author: Ben Trovato,
\href{mailto:trovato@corporation.com}{trovato@corporation.com};
Institute for Clarity in Documentation, P.O. Box 1212, Dublin,
Ohio, USA, 43017-6221}
```

The design of the cover page may require additional runs of latex to make the elements of the page align.

Internationalization

ACM accepts publications in languages other than English, as well as papers in English with translations of titles, subtitles, keywords and abstracts into other languages. Papers in languages other than English usually have titles, subtitles (if applicable), keywords and abstracts in English. Note that CCS concepts are always typeset in English.

To submit these papers you need to set the option language in the \documentclass command. This option can be repeated, for example,

```
\documentclass[sigconf, language=french, language=english]{acmart}
```

The last language in the list is the main language of the paper, i.e. the one for the main title, abstract, body, etc. The other languages are secondary, and used for translated titles, keywords, abstracts. Thus the paper above is written in English, and has a secondary abstract and a secondary title in French. On the other hand, a paper in French wih secondary titles and abstracts in English and German should use, for example

```
\documentclass[sigconf,
               language=german,
               language=english,
               language=french]{acmart}
```

This key can use any language defined in babel package [3] (currently the package is tested with English, French, German and Spanish languages; other languages may require a translation of \keywordsname macro). Actually acmart loads babel internally, so you can use the facilities provided by this package.

If this key is set, you have access to several additional top matter commands.

\translatedtitle

The commands $\translatedtitle{\langle language \rangle}$ title, $\translatedsubtitle{\langle language \rangle}$ subtitle \translatedsubtitle and \translatedkeywordslanguagekeywords are used to set title, subtitle and key-\translatedkeywords words in the secondary language. For example, a paper in English with French title and abstract may set

```
\title{A note on computational complexity}
\translatedtitle{french}{Remarque sur la complexit\'e de calcul}
while a paper in French should set
 \title{Remarque sur la complexit\'e de calcul}
\translatedtitle{english}{A note on computational complexity}
```

translatedabstract (env.)

Similarly, translatedabstract environment has a mandatory language argument, for example,

```
\begin{translatedastract}{english}
 This is the English version of the abstract
\end{translatedastract}
```

You can repeat these commands if a paper has more than one secondary language. Use the standard commands (\title, \subtitle, \keywords, abstract) for the main language of the paper.

2.7 Algorithms

There are now several good packages for typesetting algorithms [4, 5, 6], and the authors are free to choose their favorite one.

2.8 Figures and tables

The 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 tables *before* the table bodies.
- 2. The ACM uses the standard types for figures and tables and adds several new ones. In total there are the following types:

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

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

teaserfigure: a special figure before \maketitle.

- 3. Accordingly, when scaling images, one should use the following sizes:
 - (a) For teaserfigure, figure in one-column mode or figure* in two-column mode, use \textwidth. In one-column mode, you can also use \columnwidth, which coincides with \textwidth in this case.
 - (b) For figure in two-column mode, use \columnwidth.

It is strongly recommended to use the package booktabs [7] 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 the TeX FAQ [1]. The simplest one is to use a \min page 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\ Square \
 Node Number
                & 289\\
 Node Placement & Uniform\\
 Application
                 & Many-to-Many/Gossip CBR Streams\\
 Payload Size
                & 32 bytes\\
```

```
Routing Layer & GF\\
                & CSMA/MMSN\\
 MAC Laver
 Radio Laver
                & RADIO-ACCNOISE\\
 Radio Bandwidth & 250Kbps\\
                & 20m--45m\\
 Radio Range
 \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}
```

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

2.9 Descriptions of images

\Description Some readers of ACM publications might be visually challenged. These readers might use a voice-over software to read aloud the papers. It is important to provide them a description of each image used in the paper.

The command $\ensuremath{\mbox{\mbox{\mbox{$Nort$}}} (short\ description)} {\langle long\ description \rangle}$ should be placed inside every figure, teaserfigure or marginfigure environment to provide a description of the image(s) used in the figure. Unlike \caption, which is used alongside the image, \mbox{\mbox{\mbox{\$Description\$}} is intended to be used instead of the image, for example,

```
\begin{figure}
  \centering
  \includegraphics{voltage}
  \Description{A bell-like histogram centered at $0.5$~V with most measurements between $0.2$~V and $0.8$~V}
  \caption{Histogram of the measurements of voltage}
  \label{fig:voltage}
\end{figure}
```

At present the lack of descriptions generates a warning at compilation.

2.10 Theorems

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

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

These environments are defined by default. In the unusual circumstance that a user does not wish to have these environments defined, the option acmthm=false in the preamble will suppress them.

Sometimes authors want to define new theorem-like constructs that use theorem counters. These constructs must be defined either after \begin{document}, or delayed using \AtEndPreamble macro, for example,

```
\AtEndPreamble{%
  \theoremstyle{acmdefinition}
  \newtheorem{remark}[theorem]{Remark}}
```

2.11 Online-only and offline-only material

printonly (env.) Some supplementary material in ACM publications is put online but not in the printed screenonly (env.) 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 typeset only when this option is set to false. For example,

```
\section{Supplementary materials}
\begin{printonly}
Supplementary materials are available in the online version of this paper.
\end{printonly}
\begin{screenonly}
(The actual supplementary materials.)
\end{screenonly}
```

We use the comment package for typesetting this code, so \begin and \end should start on a line of their own with no leading or trailing spaces.

2.12 Note about anonymous mode

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

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

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

To suppress short snippets of information, use the command $\anon[\langle substitute \rangle] \{\langle suppressed-text \rangle\}$. By default $[\langle substitute \rangle]$ is the word ANONYMOUS. Examples:

```
This work was performed at \anon{NSA}.
This work was performed at \anon[No Such Agency]{NSA}.
```

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

acks (env.)

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

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

\grantsponsor

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

```
\proonup \
```

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

At present $\{\langle sponsorID \rangle\}$ is chosen by the authors and can be an arbitrary key in the same way the label of a \cite is arbitrarily chosen. There might be a change to this policy if the 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. This work is
  supported by the \grantsponsor{GS501100001809}{National Natural
  Science Foundation of
 China}{https://doi.org/10.13039/501100001809} under Grant
 No.: ~\grantnum{GS501100001809}{61273304}
  and \grantnum[http://www.nnsf.cn/youngscientists] {GS501100001809} {Young
  Scientists' Support Program }.
\end{acks}
```

Bibliography 2.14

The ACM lets you use either BibTeX or BibLeTeX to process your references: they require slightly different setup of your LTFX file, as detailed in the following subsections.

2.14.1 Processing using BibT_FX

This uses the natbib package for formatting references and the BibTFX style file ACM-Reference-Format.bst for BibTFX processing. You can disable loading of natbib

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 citation styles using the command \citestyle: the author-year format acmauthoryear or the numeric format acmnumeric. For example,

```
\citestyle{acmauthoryear}
```

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

\setcitestyle

You can further customize natbib using the \setcitestyle command, for example,

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

One of the more common versions is

```
\setcitestyle{nosort}
```

It is useful if you do not like the way natbib sorts citation lists.

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 author-date mode.

Note that before version 1.48 the command \citeyear put the year in parentheses. In version 1.48 and later it produces just the year; the command \citeyearpar can be used to emulate its old behavior.

There are several customized $\mbox{Bib}T_{\mbox{E}}X$ entry types and fields in the ACM style file ACM-Reference-Format. bst that you may want to be aware of.

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

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

Normally the printing of URL is suppressed if DOI is present. However, there is a special field distinctURL. If it is present and is not zero, URL is printed even if DOI is present.

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

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

See the examples at https://arxiv.org/help/hypertex/bibstyles.

There are several special entry types. Types online and game are used for Web pages and games, for example,

Entry types artifactsoftware, artifactdataset (with synonyms software and dataset) can be used to cite software artifacts and datasets, for example,

```
@ArtifactSoftware{R,
   title = {R: A Language and Environment for Statistical Computing},
   author = {{R Core Team}},
  organization = {R Foundation for Statistical Computing},
   address = {Vienna, Austria},
   year = \{2019\},
  url = {https://www.R-project.org/},
@ArtifactDataset{UMassCitations,
          = {Sam Anzaroot and Andrew McCallum},
 author
          = {{UMass} Citation Field Extraction Dataset},
 title
year
           = 2013.
url
   {http://www.iesl.cs.umass.edu/data/data-umasscitationfield},
 lastaccessed = {May 27, 2019}
```

For these entry types you can use the lastaccessed field to add the access date for the URL.

There are two ways to enter video or audio sources in the bibliograpy corresponding to two different possibilies. For standalone sources available online, you can use an online entry and set its howpublished field. For example,

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

For sources available as attachments to conference proceedings and similar documents, you can use the usual inproceedings entry type and set its howpublished field:

```
@Inproceedings{Novak03,
 author =
               "Dave Novak",
               "Solder man",
 title =
               "ACM SIGGRAPH 2003 Video Review on Animation theater Program",
booktitle =
               "2003",
 year =
 publisher =
               "ACM Press",
 address =
                "New York, NY",
               "4",
 pages =
                "March 21, 2008",
 month =
                "10.9999/woot07-S422",
 doi =
 howpublished = "Video",
```

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

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

If you do not know the year of publication, the style will add "[n. d.]" (for "no date") to the entry.

If you do not know the author (this is often the case for online entries), use the key field to add a key for sorting and citations, for example,

A note about sorting. The current ACM bibliography styles always sort the entries according to authors names and publication year. There is a controversy about sorting names with "von" or "van" part: should Ludwig van Beethoven be sorted under "V" or under "B"? The American practice is to use "van" in sorting, i.e. to file van Beethoven under "V". However, some authorities recommend to sort Dutch persons according to their last names (see e.g. https://www.ifla.org/files/assets/cataloguing/pubs/names-of-persons_1996.pdf). While I do not want to take a part in this dispute, I would like to point to the old "noopsort" trick by Oren Patashnik. Add to the .bib file the line

```
@PREAMBLE{"\providecommand{\noopsort}[1]{}"}
and then encode the author as
author = {Ludwig {\noopsort{Beethoven}}van Beethoven},
```

This will make the author to be sorted as "Beethoven" rather than "van Beethoven".

The current bst style defines a number of macros for common journal names. In particular, all journals listed in Table 5 are includes, so you can use strings like journal = taccess for ACM Transactions on Accessible Computing.

2.14.2 Processing using BibLTFX

You will find in this package two sets of style files for BibLATEX, acmnumeric and acmauthoryear, that mimic the behaviour of the ACM-Reference-Format.bst BibTEX sytle. They provide you access to all the power of BibLATEX and already include support for advanced citation of software artefact from the biblatex-software package, also separately available on CTAN. Look at the biblatex-software documentation to learn more about what it offers.

There are a few key differences in how the LTEX sources are set up when using BibLTEX instead of BibTEX, that we summarize briefly here (please refer to the official BibLTEX documentation for more details).

In the preamble of your document you need to load the BibLATEX package and select the approriate bibliography style, as follows

```
\RequirePackage[
datamodel=acmdatamodel,
style=acmnumeric, % use style=acmauthoryear for publications that require it
]{biblatex}
```

Also in the preamble, you need to declare the bibliography sources files using the \addbibresouce directe (one \addbibresource command per source file), e.g.:

```
\addbibresource{software.bib}
\addbibresource{sample-base.bib}
```

At the end of the document, where you want the bibliography to appear, you need to place the command \printbibliography.

Look at the sample-*-biblatex.tex files that can be found in the samples directory after running make for templates showcasing these BibLTFX styles.

2.15 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 [8]: ACMBlue, ACMYellow, ACMOrange, ACMRed, ACMLightBlue, ACMGreen, ACMPurple and ACMDarkBlue. You can use them in color assignments.

The ACM provides the following recommendation on color use.

The most accessible approach would be to ensure that your article is still readable when printed in greyscale. The most notable reasons for this are:

- 1. The most common type of inherited Color Vision Deficiency (CVD) is red-green (in which similar-brightness colors that differ only in their amounts of red or green are often confused), and it affects up to 8% of males and 0.5% of females of Northern European descent.
- 2. The most common type of acquired Color Vision Deficiency (CVD) is blue-yellow (including mild cases for many older adults).
- 3. Most printing is in black and white.
- 4. Situational impairments (e.g., bright sunlight shining on a mobile screen) tend to reduce the entire color gamut, reducing color discriminability.

Note: It is *not* safe to encode information using only variations in color (i.e., only differences in hue and/or saturation) as there is bound to be someone affected!

To ensure that you are using the most accessible colors, the ACM recommends that you choose sets of colors to help ensure suitable variations in when printed in greyscale by using either of the following tools:

- ColourBrewer: http://colorbrewer2.org/
- 2. ACE: The Accessible Colour Evaluator: http://daprlab.com/ace/ for designing WCAG 2.0 compliant palettes.

2.15.1 Manual bibliography

Some people create bibliographies manually, writing down \bibitem commands explicitly. This approach is *not* recommended for ACM styles. The reason is, ACM submissions, besides being typeset, are also processed by special programs that extract metadata and references. Bibliographies created automatically with ACM styles contain customized macros for these programs, for example,

Manual bibliographies without these macros may slow down the publication process, and thus are not recommended for ACM submissions.

2.16 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

The package subcaption [9] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages nomencl [10] and glossaries [11] 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 or end of the page) and hyphenation at the end of the page. This is done by the 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.

Note that the uppercasing in section titles is done using the textcase package [12], so the command \NoCaseChange inside the title may help to prevent extraneous uppercasing.

2.17 Counting words

Some ACM conferences use word count limits for papers. The calculation of word number for a paper with math, tables and figures is not a trivial task. Currently the authoritative word count is done by translating the PDF to text and using wc -w on the output. Authors can use the package texcount (used by Overleaf) to get an estimate of the word count. To faciliate this one adds to the beginning of the package metacomments

```
%TC:macro \cite [option:text,text]
%TC:macro \citep [option:text,text]
%TC:macro \citet [option:text,text]
%TC:envir table 0 1
%TC:envir table* 0 1
%TC:envir tabular [ignore] word
%TC:envir displaymath 0 word
%TC:envir math 0 word
%TC:envir comment 0 0
```

and uses \begin{math}...\end{math} instead of dollar signs for math. Note that the count is in any case approximate, and the final decision of editors is based on PDF count. The script texcount provides a report of word count in the document.

2.18 Creative Commons licenses for ACM publications

At present ACM does not allow the authors to typeset Creative Commons license for most ACM publications. These licenses can be used under an agreement with the ACM publishing office. In this case they are inserted by ACM itself.

The exceptions are ACM Engage format, which allows Creative Commons license, and conferences organized and copyrighted by IW3C2. In these cases the authors should use correspondingly \setcopyright{cc}, \setcopyright{iw3c2w3}, or \setcopyright{iw3c2w3g} (the latter should be used by Google employees).

Yet another case is the typesetting of non-ACM materials, when the option nonacm is used. This case is somewhat opposite, because for this case *only* Creative Common licenses are supported.

The command \setcopyright{cc} produces an error unless the format is acmengage or nonacm option is selected. On the other hand, if the option nonacm is selected, any argument of \setcopyright other than cc is treated as none.

2.19 Disabled or forbidden commands

The goal of acmart package is to provide a uniform look and feel for ACM publications. Accordingly, a number of commands is forbidden or disabled in acmart.

You may *not* put several authors or several e-mails into a \author or \email command. This may lead to errors or warning.

You cannot change \baselinestretch in your document: this produces an error.

You should not abuse the command \vspace: this command may disturb the type-setting of ACM papers.

You should not load amssymb package since the package acmart defines the corresponding symbols itself.

2.20 Notes for wizards

Sometimes you need to change the behavior of acmart. The usual way to do this is to redefine commands in the preamble. However, these definitions are executed *after* acmart is loaded and certain decisions are made. This presents a number of problems.

For example, one may want to use the titletoc package with acmart. This package should be loaded before hyperref. However, since acmart loads hyperref itself, the line \usepackage{titletoc} in the preamble will lead to grief (see http://tex.stackexchange.com/questions/357265/using-titletoc-with-acm-acmart-style).

Another example is passing options to a package. Suppose you want to use the dvipsnames option of the xcolor package. Normally you cannot do this because acmart loads this package itself without options.

The file acmart-preload-hook.tex can be used to solve these problems. If this file exists, it will be processed before any other package. You can use this file to load packages or pass options to them. For example, if you put in this file

```
\let\LoadClassOrig\LoadClass
\renewcommand\LoadClass[2][]{\LoadClassOrig[#1]{#2}%
\usepackage{titletoc}}
```

then titletoc will be loaded before hyperref. If you put in this file

\PassOptionsToPackage{dvipsnames}{xcolor}

you will pass dvipsnames to xcolor.

Important note. This hook makes it too easy to create a manuscript that is not acceptable by the ACM. It is even easier to create a file that cannot be compiled. So please do not use it *unless you know what you are doing*. And if you use it, *do not ask for support*. If you decide to use this hook, you are on your own.

\AtBeginMaketitle

Another hook is \AtBeginMaketitle . The commands in this hook are executed before \atMaketitle .

2.21 Currently supported publications

Table 5: ACM publications and arguments of the \acmJournal command

Abbreviation	Publication
ACMJCSS	ACM Journal on Computing and Sustainable Societies
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DLT	Distributed Ledger Technologies: Research and Practice
DGOV	Digital Government: Research and Practice

Table 5: ACM publications and arguments of the \acmJournal command (continued)

Abbreviation	Publication
DTRAP	Digital Threats: Research and Practice
FAC	Formal Aspects of Computing
GAMES	ACM Games: Research and Practice
HEALTH	ACM Transactions on Computing for Healthcare
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JATS	ACM Journal on Autonomous Transportation Systems
JDIQ	ACM Journal of Data and Information Quality
JDS	ACM/IMS Journal of Data Science
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
JRC	ACM Journal on Responsible Computing
PACMCGIT	Proceedings of the ACM on Computer Graphics and Interactive Tech-
D. O. WIOT	niques
PACMHCI	PACM on Human-Computer Interaction
PACMOD	PACM on Management of Data
PACMNET	PACM on Networking
PACMPL	PACM on Programming Languages
PACMSE	PACM on Software Engineering
POMACS	PACM on Measurement and Analysis of Computing Systems
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALL	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information
TAD	Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TDS	ACM/IMS Transactions on Data Science
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
TELO	ACM Transactions on Evolutionary Learning ACM Transactions on Human-Robot Interaction
THRI	
TIIS	ACM Transactions on Interactive Intelligent Systems
TIOT	ACM Transactions on Information and System Security
TISSEC	ACM Transactions on Information and System Security
TIST TKDD	ACM Transactions on Intelligent Systems and Technology
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Management Information Systems ACM Transactions on Computing Education
TOCHI TOCL	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computer Systems
	ACM Transactions on Computer Systems ACM Transactions on Computation Theory
ТОСТ	ACIVI Transactions on Computation Meory

Table 5: ACM publications and arguments of the \acmJournal command (continued)

Abbreviation	Publication
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 Com-
	puting Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPML	ransactions on Probabilistic Machine Learning
TOPS	ACM Transactions on Privacy and Security
TORS	ACM Transactions on Recommender Systems
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TQC	ACM Transactions on Quantum Computing
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

Besides the publications listed in Table 5, there is a special "publication" type FACMP, a forthcoming ACM publication, reserved for new journals which are not assigned an ISSN yet.

A note about sigchi-a format 2.22

Starting in Spring 2020 ACM retired SIGCHI Extended Abstract format (sigchi-a). ACM will not, under any circumstances, accept documents in this format for publication and will not offer technical support to the authors who use this template.

You may use this format in the nonacm mode only, as in

\documentclass[sigchi-a, nonacm]{acmart}

sidebar (env.) margintable (env.)

This format has large margin uses for special figures and tables. This package promarginfigure (env.) vides three environments for this with optional captions:

sidebar: textual information in the margin,

marginfigure: a figure in the margin, margintable: a table in the margin.

The environments figure and table produce figures and tables with the width of the text column. The environments figure* and table* produce "wide" figures and tables, which take a large part of the margin.

The horizontal sizes of figures are:

 $1. \ \, \text{figure: } \backslash \text{columnwidth,}$

 $2. \ {\tt marginfigure: \backslash marginparwidth,}$

3. figure*: \fulltextwidth.

3 Implementation

3.1 Identification

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

```
1 \( class \) \NeedsTeXFormat{LaTeX2e}
2 (*gobble)
3 \ProvidesFile{acmart.dtx}
4 (/gobble)
5 (class)\ProvidesClass{acmart}
_{6} [2024/01/21 v2.02 Typesetting articles for the Association for Computing Machinery]
  And the driver code:
7 (*gobble)
8 \documentclass{ltxdoc}
9 \usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx, longtable}
10 \usepackage[tt=false, type1=true]{libertine}
11 \usepackage[varqu]{zi4}
12 \usepackage[libertine]{newtxmath}
13 \usepackage[tableposition=top]{caption}
14 \usepackage{hypdoc}
15 \PageIndex
16 \CodelineIndex
17 \RecordChanges
18 \EnableCrossrefs
19 \begin{document}
20 \DocInput{acmart.dtx}
21 \end{document}
_{22}\left\langle /gobble\right\rangle
23 (*class)
24 \def\@classname{acmart}
```

3.2 Preload hook

We preload acmart-preload-hook:

3.3 Options

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

```
29 \RequirePackage{xkeyval}
We use xstring to check whether user input is valid
30 \RequirePackage{xstring}
We need iftex to check the engine
31 \RequirePackage{iftex}
```

```
format The possible formats
                            {\tt 32 \setminus define@choicekey*+\{acmart.cls\}\{format\}[\land ACM@format@nr]\{\%\})} \\
                            manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
                               sigplan, sigchi, sigchi-a, acmengage, acmcp}[manuscript]{}{%
                            34
                                \ClassError{\@classname}{The option format must be manuscript,
                            35
                                  acmsmall, acmlarge, acmtog, sigconf, siggraph,
                                  sigplan, sigchi or sigchi-a}}
                            38 \end{area} ACMFormat $$1{\end{area} in $\mathbb{F}^{\end{area} format $$41}} $$
                            39 \@DeclareACMFormat{manuscript}
                            40 \@DeclareACMFormat{acmsmall}
                            41 \@DeclareACMFormat{acmlarge}
                            42 \@DeclareACMFormat{acmtog}
                            43 \@DeclareACMFormat{sigconf}
                            44 \@DeclareACMFormat{siggraph}
                            45 \@DeclareACMFormat{sigplan}
                            46 \@DeclareACMFormat{sigchi}
                            47 \@DeclareACMFormat{sigchi-a}
                            48 \@DeclareACMFormat{acmengage}
                            49 \@DeclareACMFormat{acmcp}
                            50 \ExecuteOptionsX{format}
           \if@ACM@screen Whether we use screen mode
                            51 \define@boolkey+{acmart.cls}[@ACM@]{screen}[true]{%
                            52 \if@ACM@screen
                                  \PackageInfo{\@classname}{Using screen mode}%
                            53
                               \else
                            54
                            55
                                  \PackageInfo{\@classname}{Not using screen mode}%
                               fi}{\PackageError{\Qclassname}} The option screen can be either true or
                            57
                                  false}}
                            58 \ExecuteOptionsX{screen=false}
\if@ACM@urlbreakonhyphens
                            59 \define@boolkey+{acmart.cls}[@ACM@]{urlbreakonhyphens}[true]{%
                            60 \if@ACM@urlbreakonhyphens
                                  \PackageInfo{\@classname}{Using breaking urls on hyphens}%
                            61
                            62
                               \else
                                  \PackageInfo{\@classname}{Not breaking urls on hyphens}%
                            63
                            64 \ fi}{\Lambda extra (Classname)} The option urlbreakonhyphens can be either true or
                            65
                            66 \ExecuteOptionsX{urlbreakonhyphens=true}
           \if@ACM@acmthm Whether we define theorem-like environments.
                            67 \define@boolkey+{acmart.cls}[@ACM@]{acmthm}[true]{%
                               \if@ACM@acmthm
                            68
                                  \PackageInfo{\@classname}{Requiring acmthm}%
                            69
                            70
                                  \PackageInfo{\@classname}{Suppressing acmthm}%
                            71
                                fi}{\PackageError{\Qclassname}}{The option acmthm can be either true or }
                            72
                            73
                            74 \ExecuteOptionsX{acmthm=true}
           \if@ACM@review Whether we use review mode
                            75 \define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
```

```
\if@ACM@review
                         76
                               \PackageInfo{\@classname}{Using review mode}%
                         77
                               \AtBeginDocument{\@ACM@printfoliostrue}%
                         78
                           \else
                         79
                               \PackageInfo{\@classname}{Not using review mode}%
                         80
                            \fi}{\PackageError{\@classname}{The option review can be either true or
                         81
                         83 \ExecuteOptionsX{review=false}
  \if@ACM@authorversion Whether we use author's-version mode
                         84 \define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
                           \if@ACM@authorversion
                               \PackageInfo{\@classname}{Using authorversion mode}%
                         86
                         87
                            \else
                         88
                               \PackageInfo{\@classname}{Not using authorversion mode}%
                         89 \fi}{\PackageError{\@classname}{The option authorversion can be either true or
                         90
                         91 \ExecuteOptionsX{authorversion=false}
        \if@ACM@nonacm Special option for non-ACM publications using the ACM typesetting options.
                         92 \define@boolkey+{acmart.cls}[@ACM@]{nonacm}[true]{%
                           \if@ACM@nonacm
                         93
                               \PackageInfo{\@classname}{Using nonacm mode}%
                         94
                               \AtBeginDocument{\@ACM@printacmreffalse}%
                         95
                               % in 'nonacm' mode we disable the "ACM Reference Format"
                         96
                               % printing by default, but this can be re-enabled by the
                               % user using \settopmatter{printacmref=true}
                         98
                         99
                             \else
                               \PackageInfo{\@classname}{Not using nonacm mode}%
                        100
                             fi}{\PackageError{\Qclassname}} The option nonacm can be either true or
                        101
                        102
                               false}}
                        103 \ExecuteOptionsX{nonacm=false}
       \if@ACM@balance Whether to balance the last page
                        104 \define@boolkey+{acmart.cls}[@ACM@]{balance}[true]{}{%
                            \PackageError{\@classname}{The option balance can be either true or
                        105
                               false}}
                        106
                        107 \ExecuteOptionsX{balance}
      \if@ACM@pbalance Whether to balance the last page
                        \PackageError{\@classname}{The option pbalance can be either true or
                        109
                        110
                        111 \ExecuteOptionsX{pbalance=false}
\if@ACM@natbib@override This macro is no longer used.
        \if@ACM@natbib Whether we use natbib mode
                        112 \define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
                        113 \if@ACM@natbib
                               \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
                        114
                        115 \else
                               \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
                        116
                        fi}{\position{Qclassname}{The option natbib can be either true or } \
```

```
118
                                                       false}}
                                          119 \ExecuteOptionsX{natbib=true}
    \if@ACM@anonymous Whether we use anonymous mode
                                          120 \define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
                                                   \if@ACM@anonvmous
                                                        \PackageInfo{\@classname}{Using anonymous mode}%
                                          122
                                          123
                                                   \else
                                                        \PackageInfo{\@classname}{Not using anonymous mode}%
                                          124
                                                   fi}{\position{0.5cm} \position{Moral Market Marke
                                          125
                                          126
                                          127 \ExecuteOptionsX{anonymous=false}
    \if@ACM@timestamp Whether we use timestamp mode
                                          {\tt 128 \setminus define@boolkey+\{acmart.cls\}[@ACM@]\{timestamp\}[true]\{\%\}} \\
                                                   \if@ACM@timestamp
                                          129
                                                        \PackageInfo{\@classname}{Using timestamp mode}%
                                          130
                                          131
                                                        \PackageInfo{\@classname}{Not using timestamp mode}%
                                          132
                                                   \fi}{\PackageError{\@classname}{The option timestamp can be either true or
                                          133
                                          135 \ExecuteOptionsX{timestamp=false}
\if@ACM@authordraft Whether we use author-draft mode
                                          136 \define@boolkey+{acmart.cls}[@ACM@]{authordraft}[true]{%
                                          137
                                                   \if@ACM@authordraft
                                          138
                                                        \PackageInfo{\@classname}{Using authordraft mode}%
                                          139
                                                        \@ACM@timestamptrue
                                          140
                                                       \@ACM@reviewtrue
                                          141
                                                   \else
                                                        \PackageInfo{\@classname}{Not using authordraft mode}%
                                          142
                                                  fi}{\PackageError{\Qclassname}} The option authordraft can be either true or
                                          143
                                                       false}}
                                          144
                                          145 \ExecuteOptionsX{authordraft=false}
            \ACM@fontsize The font size to pass to the base class
                                          146% \changes{v1.87}{2022/08/27}{Added fontsize 8pt}
                                          147 \def\ACM@fontsize{}
                                          149 \DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
                                          150 \DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
                                          151 \DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
                                          152 \DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}
          \ACM@languages The languages of the document
                                          153 \def\ACM@languages{}
                                          154 \DeclareOptionX{language}{%
                                                  \ifx\ACM@languages\@empty
                                                   \gdef\ACM@languages{english}\fi
                                          156
                                                   \g@addto@macro\ACM@languages{, #1}}
                                          {\tt 158 \setminus DeclareOptionX\{draft\}\{\setminus PassOptionsToClass\{\setminus CurrentOption\}\{amsart\}\}}
                                          {\tt 159 \setminus DeclareOptionX\{*\}{\setminus PassOptionsToClass\{\setminus CurrentOption\}\{amsart\}\}}}
                                          160 \ProcessOptionsX
                                          161 \ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}
```

3.4 Setting switches

197 \else

```
\if@ACM@manuscript Whether we use manuscript mode
                          162 \newif\if@ACM@manuscript
         \if@ACM@journal There are two kinds of publications: journals and books
                          163 \newif\if@ACM@journal
\if@ACM@journal@bibstrip Sometimes ACM wants a journal-like publication to have conference information in the
                         bibstrip and vice versa, so we have an additional switch.
                          164 \newif\if@ACM@journal@bibstrip
     \if@ACM@sigchiamode The formatting of SIGCHI extended abstracts is quite unusual. We have a special switch
                         for them.
                          165 \newif\if@ACM@sigchiamode
          \if@ACM@engage ACM Engage course materials have special formatting
                          166 \newif\if@ACM@engage
                          167 \@ACM@engagefalse
           \if@ACM@acmcp ACM cover page formatting
                          168 \newif\if@ACM@acmcp
                          169 \@ACM@acmcpfalse
                             Setting up switches
                          170 \ifnum\ACM@format@nr=5\relax % siggraph
                          171 \ClassWarning{\@classname}{%
                              The format siggraph is now obsolete.\MessageBreak
                               I am switching to sigconf.}
                          173
                               \setkeys{acmart.cls}{format=sigconf}
                          174
                          175 \fi
                          176 \ifnum\ACM@format@nr=7\relax % sigchi
                          177 \ClassWarning{\@classname}{%
                          178 The format sigchi is now obsolete.\MessageBreak
                              I am switching to sigconf.}
                             \setkeys{acmart.cls}{format=sigconf}
                          181 \fi
                          182 \ifnum\ACM@format@nr=8\relax % sigchi
                          183 \ClassWarning{\@classname}{%
                          184 ACM SIGCHI has retired the SIGCHI-A template\MessageBreak
                          effective immediately. ACM is keeping this template\MessageBreak
                          option available to authors who are working on legacy\MessageBreak
                          documents only. ACM will not, under any circumstances,\MessageBreak
                          accept documents in this format for publication and\MessageBreak
                              will not offer technical support to the authors who use\MessageBreak
                          189
                              this template.\MessageBreak
                          190
                              ACM SIGCHI is directing Conference leaders and\MessageBreak
                              authors to publish their articles using the SIGCONF\MessageBreak
                          193 template call.}
                          194 \fi
                          195 \ifnum\ACM@format@nr=0\relax
                          196 \@ACM@manuscripttrue
```

```
\@ACM@manuscriptfalse
199\fi
200 \@ACM@sigchiamodefalse
201 \ifcase\ACM@format@nr
202 \relax % manuscript
203 \@ACM@journaltrue
204 \or % acmsmall
205 \@ACM@journaltrue
206 \or % acmlarge
207 \@ACM@journaltrue
208 \or % acmtog
209 \@ACM@journaltrue
210 \or % sigconf
211 \@ACM@journalfalse
212 \or % siggraph
213 \@ACM@journalfalse
214 \or % sigplan
215 \@ACM@journalfalse
216 \or % sigchi
217 \@ACM@journalfalse
218 \or % sigchi-a
219 \@ACM@journalfalse
220 \@ACM@sigchiamodetrue
221 \or % acmengage
222 \@ACM@journalfalse
223 \@ACM@engagetrue
224 \or % acmcp
225 \@ACM@journaltrue
   \@ACM@acmcptrue
227 \AtBeginDocument{\@ACM@printacmreffalse}%
228\fi
229 \if@ACM@journal
230 \@ACM@journal@bibstriptrue
231 \else
232 \@ACM@journal@bibstripfalse
233 \fi
```

3.5 Loading the base class and package

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

```
234 \ifx\ACM@fontsize\@empty
235 \ifcase\ACM@format@nr
236 \relax % manuscript
      \def\ACM@fontsize{9pt}%
237
   \or % acmsmall
238
      \def\ACM@fontsize{10pt}%
239
   \or % acmlarge
      \def\ACM@fontsize{10pt}%
242 \or % acmtog
     \def\ACM@fontsize{9pt}%
243
244 \or % sigconf
     \def\ACM@fontsize{9pt}%
245
   \or % siggraph
246
      \def\ACM@fontsize{9pt}%
247
```

```
\or % sigplan
                   248
                          \def\ACM@fontsize{10pt}%
                   249
                         \or % sigchi
                   250
                          \def\ACM@fontsize{9pt}%
                   251
                        \or % sigchi-a
                   252
                          \def\ACM@fontsize{10pt}%
                   253
                   254
                        \or % acmengage
                          \def\ACM@fontsize{10pt}%
                   256
                        \or % acmcp
                          \def\ACM@fontsize{9pt}%
                   257
                        \fi
                   258
                   259 \fi
                   260 \ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
                   261 \LoadClass[\ACM@fontsize, reqno]{amsart}
                   262 \RequirePackage{microtype}
                      We need etoolbox for delayed code
                   263 \RequirePackage{etoolbox}
                      Booktabs is now the default
                   264 \RequirePackage{booktabs}
                      We need totpages to calculate the number of pages and refcount to use that num-
                   ber
                   265 \RequirePackage{refcount}
                   266 \RequirePackage{totpages}
                      The \collect@body macro in amsmath is defined using \def. We load environ to
                   access the \long version of this command
                   267 \RequirePackage{environ}
                      We use setspace for double spacing
                   268 \if@ACM@manuscript
                   269 \RequirePackage{setspace}
                   270 \onehalfspacing
                   271 \fi
                      We need textcase for better upcasing
                   272 \RequirePackage{textcase}
                   273 \if@ACM@acmcp
                   274 \RequirePackage{framed}
                   275 \RequirePackage{zref-savepos, zref-user}
\@ACM@acmcp@delta We need to store the dimen to store the insert length of amcp box
                   277 \newdimen\@ACM@acmcp@delta
                   278 \@ACM@acmcp@delta=0pt\relax
```

3.6 Citations

We patch \setcitestyle to allow, for example, \setcitestyle{sort} and \setcitestyle{nosort}. We patch \citestyle to warn about undefined citation styles.

```
279 \if@ACM@natbib
280 \RequirePackage{natbib}
281 \renewcommand{\bibsection}{%
```

```
\section*{\refname}%
282
                    \phantomsection\addcontentsline{toc}{section}{\refname}%
283
           }
284
            \renewcommand{\bibfont}{\bibliofont}
285
            \renewcommand\setcitestyle[1]{
286
            \ensuremath{\texttt{Qfor}\ensurema:=\#1\do}
287
            288
                    \renewcommand\NAT@open{(}\renewcommand\NAT@close{)}\fi
289
290
              \def\@tempb{square}\ifx\@tempa\@tempb
                    \renewcommand\NAT@open{[}\renewcommand\NAT@close{]}\fi
291
292
              \def\@tempb{angle}\ifx\@tempa\@tempb
                    \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
293
               \def\@tempb{curly}\ifx\@tempa\@tempb
294
                    \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
295
               \def\@tempb{semicolon}\ifx\@tempa\@tempb
296
                    \renewcommand\NAT@sep{;}\fi
297
               \def\@tempb{colon}\ifx\@tempa\@tempb
298
                   \renewcommand\NAT@sep{;}\fi
              \def\@tempb{comma}\ifx\@tempa\@tempb
300
                   \renewcommand\NAT@sep{,}\fi
301
302
               \def\@tempb{authoryear}\ifx\@tempa\@tempb
                    \NAT@numbersfalse\fi
303
               \def\@tempb{numbers}\ifx\@tempa\@tempb
304
                    \NAT@numberstrue\NAT@superfalse\fi
305
               \def\@tempb{super}\ifx\@tempa\@tempb
306
307
                    \NAT@numberstrue\NAT@supertrue\fi
308
              \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
                    \let\bibstyle=\@gobble\fi
309
              \def\@tempb{bibstyle}\ifx\@tempa\@tempb
310
311
                    \let\bibstyle=\@citestyle\fi
312
              \def\@tempb{sort}\ifx\@tempa\@tempb
313
                    \def\NAT@sort{\@ne}\fi
314
              \def\@tempb{nosort}\ifx\@tempa\@tempb
                   \def\NAT@sort{\z@}\fi
315
               \def\@tempb{compress}\ifx\@tempa\@tempb
316
                   \def\NAT@cmprs{\@ne}\fi
317
               \def\@tempb{nocompress}\ifx\@tempa\@tempb
318
319
                   \def\NAT@cmprs{\z@}\fi
320
              \def\@tempb{sort&compress}\ifx\@tempa\@tempb
321
                   \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
322
              \def\@tempb{mcite}\ifx\@tempa\@tempb
323
                   \let\NAT@merge\@ne\fi
324
              \def\@tempb{merge}\ifx\@tempa\@tempb
                   325
              \label{lide} $$ \end{engg} if $x \otimes e^{\theta} . $$ if 
326
                    \@ifnum{\NAT@merge<\thr@@}{\let\NAT@merge\thr@@}{}\fi
327
328
               \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
329
                    \NAT@longnamestrue\fi
              \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
330
331
                    \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
332
              \expandafter\NAT@find@eq\@tempa=\relax\@nil
333
              \if\@tempc\relax\else
334
                    \expandafter\NAT@rem@eq\@tempc
                    \def\@tempb{open}\ifx\@tempa\@tempb
335
```

```
\xdef\NAT@open{\@tempc}\fi
                          336
                                  \def\@tempb{close}\ifx\@tempa\@tempb
                          337
                                   \xdef\NAT@close{\@tempc}\fi
                          338
                                  \def\@tempb{aysep}\ifx\@tempa\@tempb
                          339
                                   \xdef\NAT@aysep{\@tempc}\fi
                          340
                                  \def\@tempb{yysep}\ifx\@tempa\@tempb
                          341
                                   \xdef\NAT@yrsep{\@tempc}\fi
                          342
                          343
                                  \def\@tempb{notesep}\ifx\@tempa\@tempb
                          344
                                   \xdef\NAT@cmt{\@tempc}\fi
                                  \def\@tempb{citesep}\ifx\@tempa\@tempb
                          345
                                   \xdef\NAT@sep{\@tempc}\fi
                          346
                                \fi
                          347
                               }%
                          348
                               \NAT@@setcites
                          349
                          350
                               \renewcommand\citestyle[1]{%
                          351
                                 \ifcsname bibstyle@#1\endcsname%
                          352
                          353
                                 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
                          354
                                 \@latex@error{Undefined '#1' citestyle}%
                          355
                                 \fi
                          356
                              }%
                          357
                          358 \fi
\bibstyle@acmauthoryear The default author-year format:
                          {\tt 359 \ le@acmauthoryear} \{ \texttt{\%} \\
                              \setcitestyle{%
                          360
                                 authoryear,%
                          361
                          362
                                 open={[},close={]},citesep={;},%
                                 aysep={},yysep={,},%
                          363
                                 notesep={, }}}
                          364
   \bibstyle@acmnumeric The default numeric format:
                          365 \newcommand{\bibstyle@acmnumeric}{%
                              \setcitestyle{%
                          366
                                 numbers, sort&compress,%
                          367
                                 open={[},close={]},citesep={,},%
                          368
                                 notesep={, }}}
                          369
                             The default is numeric:
                          370 \if@ACM@natbib
                          371 \citestyle{acmnumeric}
                          372\fi
                               Internationalization
                         3.7
                          373 \if@ACM@journal
                          374 \renewcommand\keywordsname{Additional Key Words and Phrases}%
                          375 \else
                          376 \renewcommand\keywordsname{Keywords}%
                          377 \fi
                          378 \if@ACM@engage
                               \renewcommand\abstractname{Synopsis}%
                          379
                          380\fi
```

```
382 \else
                      \RequirePackage[\ACM@languages]{babel}%
                 383
                      \addto\captionsenglish{%
                 384
                           \if@ACM@journal
                 385
                             \renewcommand\keywordsname{Additional Key Words and Phrases}%
                 386
                           \else
                 387
                             \renewcommand\keywordsname{Keywords}%
                 388
                 389
                           \renewcommand\acksname{Acknowledgements}%
                 390
                           \if@ACM@engage
                 391
                              \renewcommand\abstractname{Synopsis}%
                 392
                           \fi
                 393
                      }%
                 394
                      \addto\captionsfrench{%
                 395
                           \if@ACM@journal
                 396
                             \renewcommand\keywordsname{Mots Clés et Phrases Supplémentaires}%
                 397
                           \else
                             \renewcommand\keywordsname{Mots clés}%
                 399
                           \fi
                 400
                           \renewcommand\acksname{Remerciements}%
                 401
                      }%
                 402
                      \addto\captionsgerman{%
                 403
                           \if@ACM@journal
                 404
                             \renewcommand\keywordsname{Zusätzliche Schlagwörter und Phrasen}%
                 405
                 406
                             \renewcommand\keywordsname{Schlagwörter}%
                 407
                 408
                           \renewcommand\acksname{Danksagungen}%
                  409
                 410
                      }%
                      \addto\captionsspanish{%
                 411
                           \if@ACM@journal
                 412
                             \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
                 413
                           \else
                 414
                             \renewcommand\keywordsname{Palabras claves}%
                 415
                 416
                           \renewcommand\acksname{Expresiones de gratitud}%
                 417
                 418
                      }%
                 419\fi
\ACM@lang@check Some commands should not be used if the document is monlingual
                 420 \newcommand\ACM@lang@check[1]{%
                      \ifx\ACM@languages\@empty\relax
                 421
                      \ClassError{\@classname}{%
                 422
                        Command \string#1 \MessageBreak is used in monlingual document}{%
                 423
                        You used a command (\string#1) \MessageBreak
                  424
                        that does not have a meaning \MessageBreak
                  425
                        unless are languages are defined. \MessageBreak
                 426
                        Please choose the languages in \string\documentclass
                 427
                        \MessageBreak
                 428
                        (e.g. \string\documentclass[languages={french, english}]{acmart}),
                 429
                        \MessageBreak
                 430
                        or delete the command.}%
                 431
                 432
                      \fi}
```

381 \ifx\ACM@languages\@empty

```
\@translatedtitle
                                                                                  433 \def\@translatedtitle{}
                         \translatedtitle The title of the paper in a different language
                                                                                  434 \newcommand\translatedtitle[2]{\ACM@lang@check{\translatedtitle}%
                                                                                  435 \g@addto@macro\@translatedtitle{\par\foreignlanguage{#1}{#2}}}
             \@translatedsubtitle
                                                                                  436 \def\@translatedsubtitle{}
               \translatedsubtitle The subtitle of the paper in a different language
                                                                                  {\tt 437 \ lecommand \ translated subtitle [2] \{\ ACM@ lang@ check \{\ translated subtitle \}\% \}} \\
                                                                                  438 \ensuremath{\mbox{\sc 4}38} \ensuremath{\mbox{\sc 4}
             \@translatedkeywords
                                                                                  439 \def\@translatedkeywords{}
               \translatedkeywords Add keywords to the paper in the language specified
                                                                                  440 \newcommand\translatedkeywords[2]{\ACM@lang@check{\translatedkeywords}%
                                                                                  441 \ensuremath{\mbox{\mbox{$1$}}} 441 \ensuremath{\mbox{\mbox{\mbox{$4$}}}} 1341 \ensuremath{\mbox{\mbox{$4$}}} 1341 \ensuremath{\mbox{$4$}} 1341 \ensuremath{
          \@translatedabstracts The container for translated abstracts.
                                                                                  442 \def\@translatedabstracts{}
                   translatedabstract We save translated abstracts into \@translatedabstracts
                                                                                  443 \newenvironment{translatedabstract}[1]{\Collect@Body
                                                                                  444 \@savetranslatedabstract\@mktranslatedabstract{#1}}{}
\@savetranslatedabstract And saving the abstract
                                                                                  445 \long\def\@savetranslatedabstract#1{\if@ACM@maketitle@typeset
                                                                                               \ClassError{\@classname}{Abstract must be defined before maketitle
                                                                                                      command. Please move it!}\fi
                                                                                  447
                                                                                              \ACM@lang@check{translatedabstract}%
                                                                                  448
                                                                                               \g@addto@macro\@translatedabstracts{\bgroup#1\egroup}}
                                                                                                  Sectioning
                                                                                3.8
                               \@startsection Before we call hyperref, we redefine \startsection commands to their LATEX defaults
                                                                               since the amsart ones are too AMS-specific. We need to do this early since we want
                                                                                hyperref to have a chance to redefine them again:
                                                                                  450 \def\@startsection#1#2#3#4#5#6{%
                                                                                  451 \if@noskipsec \leavevmode \fi
                                                                                  452 \par
                                                                                  453 \@tempskipa #4\relax
                                                                                               \@afterindenttrue
                                                                                  454
                                                                                               \ifdim \@tempskipa <\z@
                                                                                  455
                                                                                                      \@tempskipa -\@tempskipa \@afterindentfalse
                                                                                  456
                                                                                                \fi
                                                                                  457
                                                                                               \if@nobreak
                                                                                  458
                                                                                  459
                                                                                                      \everypar{}%
                                                                                  460
                                                                                                      \addpenalty\@secpenalty\addvspace\@tempskipa
```

```
\fi
462
            \@ifstar
463
                 {\@ssect{#3}{#4}{#5}{#6}}%
464
                 {\d}^{\d}_{\d}^{\#3}^{\#4}^{\#5}^{\#6}}}
465
466 \def\@sect#1#2#3#4#5#6[#7]#8{%
            \edsen \edse \ed
467
            \ifnum #2>\c@secnumdepth
468
                 \let\@svsec\@empty
469
470
            \else
                 \refstepcounter{#1}%
471
                 472
            \fi
473
            \@tempskipa #5\relax
474
            \ifdim \@tempskipa>\z@
475
                 \begingroup
476
                       #6{%
477
                             \@hangfrom{\hskip #3\relax\@svsec}%
478
                                 \interlinepenalty \@M #8\@@par}%
480
                 \endgroup
481
                 \csname #1mark\endcsname{#7}%
                 \ifnum #2>\c@secnumdepth \else
482
                            \verb|\dotangmeasure{\csname the #1\ends name}| % \\
483
                 \fi
484
                 \verb|\addcontentsline{toc}{#1}{%}|
485
                       \ifnum #2>\c@secnumdepth \else
486
                            \protect\numberline{\csname the#1\endcsname}%
487
                       \fi
488
                       #7}%
489
            \else
490
                 \def\ensuremath{\sc 0}
491
                       #6{\hskip #3\relax
492
                       \@svsec #8}%
493
                       \csname #1mark\endcsname{#7}%
494
                       \ifnum #2>\c@secnumdepth \else
495
                            \@tochangmeasure{\csname the#1\endcsname\space}%
496
497
                       \addcontentsline{toc}{#1}{%
498
499
                             \ifnum #2>\c@secnumdepth \else
500
                                 \protect\numberline{\csname the#1\endcsname}%
                            \fi
501
                            #7}}%
502
503
            \fi
            \@xsect{#5}}
504
         def\@xsect#1{%
505
            \@tempskipa #1\relax
506
            \ifdim \@tempskipa>\z@
507
                  \par \nobreak
508
                 \vskip \@tempskipa
509
                 \@afterheading
510
511
            \else
512
                 \@nobreakfalse
513
                 \global\@noskipsectrue
514
                 \everypar{%
                       \if@noskipsec
515
```

```
\global\@noskipsecfalse
                            {\setbox\z@\lastbox}%
                  517
                             \clubpenalty\@M
                  518
                             \begingroup \@svsechd \endgroup
                  519
                             \unskip
                  520
                             \@tempskipa #1\relax
                  521
                             \hskip -\@tempskipa
                  522
                           \else
                  523
                             \clubpenalty \@clubpenalty
                  524
                             \everypar{}%
                  525
                           \fi}%
                  526
                       \fi
                  527
                       \ignorespaces}
                  528
                  529 \def\@seccntformat#1{\csname the#1\endcsname\quad}
                  530 \def\@ssect#1#2#3#4#5{%
                       \@tempskipa #3\relax
                  531
                       \ifdim \@tempskipa>\z@
                  532
                         \begingroup
                  533
                  534
                           #4{%
                             \@hangfrom{\hskip #1}%
                  535
                               \interlinepenalty \@M \#5\@par}%
                  536
                         \endgroup
                  537
                       \else
                  538
                         \def\@svsechd{#4{\hskip #1\relax #5}}%
                  539
                       \fi
                  540
                       \@xsect{#3}}
                  541
  \@startsection The amsart package redefines \startsection. Here we redefine it again to make the
                 table of contents work.
                  543
                      \setTrue{#1}%
                       \par\removelastskip\vskip\z@skip
                  544
                       \label{linespacing} $$ \operatorname{section}\em \z @{\linespacing}_{\mbox{$\mathbb{Z}$}} $$
                  545
                         {.5\linespacing}{\centering\contentsnamefont}{#2}%
                  546
                       \@input{\jobname.#1}%
                  547
                       \if@filesw
                  548
                         \@xp\newwrite\csname tf@#1\endcsname
                  549
                         \immediate\@xp\openout\csname tf@#1\endcsname \jobname.#1\relax
                  550
                  551
                      \global\@nobreakfalse \endgroup
                  553
                      \addvspace{32\p@\@plus14\p@}%
                  554 }
   \l@subsection Section spacing is more generous than for amsart
                  555 \left( \frac{1}{2pc} \right)
   \l@subsection The spacing in amsart is too large
                  \label{lem:condition} $$56 \det \ell^2_{0pt}_{1pc}_{3pc}_{}$
\l@subsubsection The spacing in amsart is too large
                  557 \def\l@subsubsection{\@tocline{3}{0pt}{1pc}{5pc}{}}
```

516

We need to define foonote-related stuff before the call to hyperref (Ross Moore)

```
\@makefntext We do not use indentation for footnotes
                  558 \def\@makefntext{\noindent\@makefnmark}
  \@footnotetext In sigchi-a mode our footnotes are in the margin!
                  559 \if@ACM@sigchiamode
                  560 \long\def\@footnotetext#1{\marginpar{%
                         \reset@font\small
                         \interlinepenalty\interfootnotelinepenalty
                  562
                         \protected@edef\@currentlabel{%
                  563
                            \csname p@footnote\endcsname\@thefnmark
                  564
                         }%
                  565
                         \color@begingroup
                  566
                  567
                           \@makefntext{%
                             \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
                         \color@endgroup}}%
                  570\fi
\@mpfootnotetext We want the footnotes in minipages centered:
                  571 \long\def\@mpfootnotetext#1{%
                       \global\setbox\@mpfootins\vbox{%
                  573
                         \unvbox\@mpfootins
                  574
                         \reset@font\footnotesize
                  575
                         \hsize\columnwidth
                  576
                         \@parboxrestore
                         \protected@edef\@currentlabel
                  577
                              {\csname p@mpfootnote\endcsname\@thefnmark}%
                  578
                         \color@begingroup\centering
                  579
                           \@makefntext{%
                  580
                             \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
                  581
                         \color@endgroup}}
                  582
    \@makefnmark AMS classes use a buggy definition of \makefnmark. We revert to the standard one.
                  583 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}
```

3.9 Hyperxmp and hyperref

```
Adding hyperref
```

```
584 \let\@footnotemark@nolink\@footnotemark
585 \let\@footnotetext@nolink\@footnotetext
586 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
587 \RequirePackage{hyperxmp}
588 \pdfstringdefDisableCommands{%
589 \def\addtocounter#1#2{}%
590 \def\unskip{}%
    \def\textbullet{- }%
591
    \def\textrightarrow{ -> }%
592
593
    \def\footnotemark{}%
594 }
595 \urlstyle{rm}
596 \ifcase\ACM@format@nr
597 \relax % manuscript
598 \or % acmsmall
599 \or % acmlarge
```

```
601 \or % sigconf
                     602 \or % siggraph
                     603 \or % sigplan
                          \urlstyle{sf}
                     605 \or % sigchi
                     606 \or % sigchi-a
                          \urlstyle{sf}
                     608 \or % acmengage
                     609 \or % acmcp
                     610 \fi
                     611 \AtEndPreamble{%
                          \if@ACM@urlbreakonhyphens
                     612
                             \def\do@url@hyp{\do\-}%
                     613
                     614
                           \if@ACM@screen
                     615
                             \hypersetup{colorlinks,
                     616
                               linkcolor=ACMPurple,
                     617
                               citecolor=ACMPurple,
                     618
                               urlcolor=ACMDarkBlue,
                     619
                               filecolor=ACMDarkBlue}
                     620
                             \else
                     621
                             \hypersetup{hidelinks}
                     622
                          \fi
                     623
                           \hypersetup{pdflang={en},
                     624
                             pdfdisplaydoctitle}}
                     625
                        Bibliography mangling.
                     626 \if@ACM@natbib
                          \let\citeN\cite
                     627
                          \let\cite\citep
                     628
                          \let\citeANP\citeauthor
                     629
                          \let\citeNN\citeyearpar
                     630
                          \let\citeyearNP\citeyear
                     631
                          \let\citeNP\citealt
                     632
                     633
                           \DeclareRobustCommand\citeA
                     634
                              {\begingroup\NAT@swafalse
                                \verb|\label{lem:lem:lem:nate}| $$ \operatorname{NAT}\operatorname{Copen} \operatorname{NAT}\operatorname{Copen} \
                     635
                          \providecommand\newblock{}%
                     636
                     637 \else
                           \AtBeginDocument{%
                     638
                             \let\shortcite\cite%
                     639
                             \providecommand\citename[1]{#1}}
                     640
                     641\fi
                     642 \newcommand\shortcite[2][]{%
                          \ifNAT@numbers\cite[#1]{#2}\else\citeyearpar[#1]{#2}\fi}
\bibliographystyle The amsart package redefines \bibliographystyle since it prefers the AMS bibliogra-
                     phy style. We turn it back to the LATEX definition:
                     644 \def\bibliographystyle#1{%
                          \ifx\@begindocumenthook\@undefined\else
                     645
                             \expandafter\AtBeginDocument
                     646
                           \fi
                     647
                             {\if@filesw
                     648
```

600 \or % acmtog

```
649 \immediate\write\@auxout{\string\bibstyle{#1}}%
650 \fi}}
```

3.10 Other packages

```
Graphics and color.
651 \RequirePackage{graphicx}
652 \RequirePackage[prologue]{xcolor}
   We define ACM colors according to [8]:
653 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
654 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
655 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
\label{localization} $$ $ \end{\color[named]{ACMRed}{cmyk}{0,0.90,0.86,0}} $$
657 \definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
658 \ensuremath{\mbox{ hefinecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}}
{\tt 659 \backslash definecolor[named]{ACMPurple}{cmyk}{\{0.55,1,0,0.15\}}}
660 \ensuremath{\mbox{ hefinecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}}
   Author-draft mode or sigchi-a mode
661 \if@ACM@authordraft
     \RequirePackage{draftwatermark}
662
     \SetWatermarkFontSize{0.5in}
663
     \SetWatermarkColor[gray]{.9}
664
     \SetWatermarkText{\parbox{12em}{\centering}
665
          Unpublished working draft.\\
666
          Not for distribution.}}
667
668 \else
669
     \if@ACM@sigchiamode
670
        \if@ACM@nonacm\else
671
          \RequirePackage{draftwatermark}
          \SetWatermarkFontSize{0.5in}
672
          \SetWatermarkColor[gray]{.9}
673
          \SetWatermarkText{\parbox{12em}{\centering
674
              Legacy document. \\
675
               Not for publication in an ACM venue}}
676
       \fi
677
     \fi
678
```

3.11 Paper size and paragraphing

679\fi

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

```
680 \RequirePackage{geometry}
681 \ifcase\ACM@format@nr
682 \relax % manuscript
683 \geometry{letterpaper,head=13pt,
684 marginparwidth=6pc,heightrounded}%
685 \or % acmsmall
686 \geometry{twoside=true,
687 includeheadfoot, head=13pt, foot=2pc,
688 paperwidth=6.75in, paperheight=10in,
```

```
top=58pt, bottom=44pt, inner=46pt, outer=46pt,
689
        marginparwidth=2pc,heightrounded
690
     }%
691
692 \or % acmlarge
      \geometry{twoside=true, head=13pt, foot=2pc,
693
        paperwidth=8.5in, paperheight=11in,
694
        includeheadfoot,
695
        top=78pt, bottom=114pt, inner=81pt, outer=81pt,
696
        marginparwidth=4pc, heightrounded
697
698
        }%
699 \or % acmtog
      \geometry{twoside=true, head=13pt, foot=2pc,
700
        paperwidth=8.5in, paperheight=11in,
701
        includeheadfoot, columnsep=24pt,
702
        top=52pt, bottom=75pt, inner=52pt, outer=52pt,
703
        marginparwidth=2pc,heightrounded
704
705
        }%
706 \or % sigconf
      \geometry{twoside=true, head=13pt,
707
708
        paperwidth=8.5in, paperheight=11in,
        includeheadfoot, columnsep=2pc,
709
        top=57pt, bottom=73pt, inner=54pt, outer=54pt,
710
        marginparwidth=2pc,heightrounded
711
       }%
712
713 \or % siggraph
      \geometry{twoside=true, head=13pt,
714
        paperwidth=8.5in, paperheight=11in,
715
        includeheadfoot, columnsep=2pc,
716
        top=57pt, bottom=73pt, inner=54pt, outer=54pt,
717
        marginparwidth=2pc,heightrounded
718
719
        }%
720 \or % sigplan
      \geometry{twoside=true, head=13pt,
721
        paperwidth=8.5in, paperheight=11in,
722
        includeheadfoot=false, columnsep=2pc,
723
        top=1in, bottom=1in, inner=0.75in, outer=0.75in,
724
        marginparwidth=2pc, heightrounded
725
726
        }%
727 \or % sigchi
      \geometry{twoside=true, head=13pt,
728
729
        paperwidth=8.5in, paperheight=11in,
        includeheadfoot, columnsep=2pc,
730
        top=66pt, bottom=73pt, inner=54pt, outer=54pt,
731
        marginparwidth=2pc,heightrounded
732
       }%
733
734 \or % sigchi-a
      \geometry{twoside=false, head=13pt,
735
        paperwidth=11in, paperheight=8.5in,
736
        includeheadfoot, marginparsep=72pt,
737
738
        marginparwidth=170pt, columnsep=20pt,
739
        top=72pt, bottom=72pt, left=314pt, right=72pt
740
        }%
        \@mparswitchfalse
741
        \reversemarginpar
742
```

```
743 \or % acmengage
                  \geometry{twoside=true, head=13pt,
            744
                    paperwidth=8.5in, paperheight=11in,
            745
                    includeheadfoot, columnsep=2pc,
            746
                    top=57pt, bottom=73pt, inner=54pt, outer=54pt,
            747
                    marginparwidth=2pc,heightrounded
            748
                    }%
            749
            750 \or % acmcp
                  \geometry{twoside=true,
            751
                    includeheadfoot, head=13pt, foot=2pc,
            752
                    paperwidth=6.75in, paperheight=10in,
            753
                    top=58pt, bottom=44pt, inner=46pt, outer=46pt,
            754
                    marginparwidth=2pc,heightrounded
            755
            756
                  }%
            757 \fi
\parindent Paragraphing
 \parskip
            758 \setlength\parindent{10\p@}
            759 \setlength\parskip{\z@}
            760 \ifcase\ACM@format@nr
            761 \relax % manuscript
            762 \or % acmsmall
            763 \or % acmlarge
            764 \or % acmtog
            765 \setlength\parindent{9\p@}%
            766 \or % sigconf
            767 \or % siggraph
            768 \or % sigplan
            769∖or % sigchi
            770 \or % sigchi-a
            771 \or % acmengage
            772 \or % acmcp
            773 \fi
```

\normalparindent The amsart package defines the \normalparindent length and initializes it to 12pt (the value of \parindent in amsart). It is later used to set the \listparindent length in the quotation environment and the \parindent length in the \@footnotetext command. We set \normalparindent to the value of \parindent as selected by acmart for consistent paragraph indents.

774 \setlength\normalparindent{\parindent}

Footnotes require some consideration. We have several layers of footnotes: front-matter footnotes, "regular" footnotes and the special insert for the bibstrip. In the old ACM classes, the 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 the bibstrip from the rest of the paper. It is a full width rule.

```
775 \def\copyrightpermissionfootnoterule{\kern-3\p@
776 \hrule \@width \columnwidth \kern 2.6\p@}
777 \RequirePackage{manyfoot}
```

```
778 \SelectFootnoteRule[2]{copyrightpermission}
                779 \DeclareNewFootnote{authorsaddresses}
                780 \SelectFootnoteRule[2]{copyrightpermission}
                781 \DeclareNewFootnote{copyrightpermission}
\footnoterule Tschichold's rules:
                782 \def\footnoterule{\kern-3\p@}
                783 \hrule \@width 4pc \kern 2.6\p@}
 \endminipage We do not use footnote rules in minipages
                784 \def\endminipage{%
                785
                       \par
                786
                       \unskip
                       \ifvoid\ensuremath{\verb{@mpfootins}}
                787
                         \vskip\skip\@mpfootins
                788
                         \normalcolor
                789
                         \unvbox\@mpfootins
                790
                       \fi
                791
                       \@minipagefalse
                792
                    \color@endgroup
                793
                794
                     \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
 \@textbottom Add some stretch according to David Carlisle's advice at http://tex.stackexchange.
               com/a/62318/5522
                796 \def\@textbottom{\vskip \z@ \@plus 1pt}
                797 \let\@texttop\relax
                   In two-column layouts, force both columns to be the same height by inserting extra
               internal vertical space to fill out the page.
                798 \ifcase\ACM@format@nr
                799 \relax % manuscript
                800 \or % acmsmall
                801 \or % acmlarge
                802 \or % acmtog
                803 \flushbottom
                804 \or % sigconf
                805 \flushbottom
                806 \or % siggraph
                807 \flushbottom
                808 \or % sigplan
                809 \flushbottom
                810 \or % sigchi
                811 \flushbottom
                812 \or % sigchi-a
                813 \or % acmengage
                814 \flushbottom
                815 \ \text{or} \ \text{\%} \ \text{acmcp}
                816 \flushbottom
                817 \fi
```

3.12 Fonts

Somehow PDFTeX and XeTeX require different incantations to make a PDF compliant with the current Acrobat bugs. Xpdf is much better.

```
The code below is by Ross Moore.
                                              818 \ifPDFTeX
                                              819 \input{glyphtounicode}
                                              820 \pdfglyphtounicode\{f_f\}\{FB00\}
                                              821 \pdfglyphtounicode{f_f_i}{FB03}
                                              822 \neq f_1{FB04}
                                              823 \pdfglyphtounicode{f_i}{FB01}
                                              824 \pdfglyphtounicode{t_t}{0074 0074}
                                              825 \pdfglyphtounicode{f_t}{0066 0074}
                                              826 \pdfglyphtounicode{T_h}{0054 0068}
                                              827 \pdfgentounicode=1
                                              828 \RequirePackage{cmap}
                                              829\fi
\if@ACM@newfonts Whether we load the new fonts
                                              830 \newif\if@ACM@newfonts
                                              831 \@ACM@newfontstrue
                                              832 \fi = xists{libertine.sty}{}{\classWarning{\classname}{\coloredge do not }}
                                                               have the libertine package installed. Please upgrade your
                                              833
                                                               TeX}\@ACM@newfontsfalse}
                                              834
                                              835 \footnote{1}{1}  \ClassWarning{\@classname}{You do not
                                                               have the inconsolata (zi4.sty) package installed. Please upgrade your
                                              836
                                                               TeX}\@ACM@newfontsfalse}
                                              837
                                              838 \footnote{Months} {\classWarning(\classname){You do not }} {\classwarnin
                                                               have the newtxmath package installed. Please upgrade your
                                                               TeX}\@ACM@newfontsfalse}
                                                     We use Libertine throughout.
                                              841 \if@ACM@newfonts
                                                          \RequirePackage[T1]{fontenc}
                                                          % Note that the order in which packages are loaded matters,
                                                          % and the correct order depends on the LaTeX engine used.
                                                          % See https://github.com/borisveytsman/acmart/issues/402
                                                          % and https://github.com/borisveytsman/acmart/issues/410
                                              847
                                                          \ifxetex
                                              848
```

```
\RequirePackage[libertine]{newtxmath}
       \RequirePackage[tt=false]{libertine}
849
      \setmonofont[StylisticSet=3]{inconsolata}
850
     \else
851
       \ifluatex
852
         \RequirePackage[libertine]{newtxmath}
853
         \RequirePackage[tt=false]{libertine}
854
855
         \setmonofont[StylisticSet=3]{inconsolata}
       \else
856
          \RequirePackage[tt=false, type1=true]{libertine}
857
          \RequirePackage[varqu]{zi4}
858
          \RequirePackage[libertine]{newtxmath}
859
      \fi
860
    \fi
861
862\fi
```

```
\liningnums Libertine defines \liningnums, which makes fontspec unhappy. While we do not use
                                                 fontspec, some users do.
                                                   863 \let\liningnums\@undefined
                                                   864 \AtEndPreamble{%
                                                   865 \DeclareTextFontCommand{\liningnums}{\libertineLF}}
                                                        The SIGCHI extended abstracts are sans serif:
                                                   866 \if@ACM@sigchiamode
                                                   867 \renewcommand{\familydefault}{\sfdefault}
                                                   868 \fi
                                                  3.13 Image descriptions
\if@Description@present A local switch: whether there is a description in the given figure
                                                   869 \newif\if@Description@present
                                                   870 \@Description@presenttrue
  \if@undescribed@images A global switch whether some images were not described
                                                   871 \newif\if@undescribed@images
                                                   872 \@undescribed@imagesfalse
                      \Description The Description macro right now just sets switches
                                                   873 \newcommand\Description[2][]{\global\@Description@presenttrue\ignorespaces}
                                                        The global warning
                                                   874 \AtEndDocument{\if@undescribed@images
                                                   875 \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}
                                                        Hooks for figures and tables. We also patch algorithm and algorithm* in case
                                                  somebody uses them.
                                                   {\tt 876 \ AtBeginEnvironment\{figure\}\{\ QDescription\ Qpresentfalse\}} \\
                                                           \let\@vspace\@vspace@orig
                                                           \let\@vspacer\@vspacer@orig}
                                                   878
                                                   \let\@vspace\@vspace@orig
                                                   880
                                                           \let\@vspacer\@vspacer@orig}
                                                   881
                                                   882 \AtEndEnvironment{figure}{\if@Description@present\else
                                                           \global\@undescribed@imagestrue
                                                   \ensuremath{\tt NS4} \ensuremath
                                                   885 \AtEndEnvironment{figure*}{\if@Description@present\else
                                                   886 \global\@undescribed@imagestrue
                                                   \ensuremath{\tt NST} \classWarning{\classname}{A possible image without description}\fi}
                                                   888 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
                                                   889 \let\@vspacer\@vspacer@orig}
                                                   891 \let\@vspacer\@vspacer@orig}
                                                   892 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
                                                   893 \let\@vspacer\@vspacer@orig}
                                                   894 \AtBeginEnvironment{algorithm*}{\let\@vspace\@vspace@orig
                                                           \let\@vspacer\@vspacer@orig}
                                                   896 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
                                                           \let\@vspacer\@vspacer@orig}
```

898 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig

```
899 \let\@vspacer\@vspacer@orig}
900 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig}
901 \let\@vspacer\@vspacer@orig}
902 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig}
903 \let\@vspacer\@vspacer@orig}
904 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig}
905 \let\@vspacer\@vspacer@orig}
906 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig}
907 \let\@vspacer\@vspacer@orig}
908
```

3.14 Floats

We use the caption package

```
909 \RequirePackage{caption, float}
         910 \captionsetup[table]{position=top}
         911 \if@ACM@journal
             \captionsetup{labelfont={sf, small},
         912
                textfont={sf, small}, margin=\z@}
         913
              \captionsetup[figure]{name={Fig.}}
         914
         915 \else
              \captionsetup{labelfont={bf},
         916
                textfont={bf}, labelsep=colon, margin=\z@}
         917
              \ifcase\ACM@format@nr
         918
              \relax % manuscript
         919
              \or % acmsmall
         920
              \or % acmlarge
         921
             \or % acmtog
         922
         923
              \or % sigconf
         924
              \or % siggraph
                \captionsetup{textfont={it}}
         925
         926
              \or % sigplan
                \captionsetup{labelfont={bf},
         927
                  textfont={normalfont}, labelsep=period, margin=\z0}
         928
              \or % sigchi
         929
                \captionsetup[figure]{labelfont={bf, small},
         930
                  textfont={bf, small}}
         931
                \captionsetup[table]{labelfont={bf, small},
         932
                  textfont={bf, small}}
         933
         934
              \or % sigchi-a
                \captionsetup[figure]{labelfont={bf, small},
         935
                  textfont={bf, small}}
         936
                \captionsetup[table]{labelfont={bf, small},
         937
                  textfont={bf, small}}
         938
              \or % acmengage
         939
             \or % acmcp
         940
         941 \fi
         942\fi
sidebar The sidebar environment:
         943 \newfloat{sidebar}{}{sbar}
         944 \floatname{sidebar}{Sidebar}
         945 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}
```

```
\@sidebar The processing of the saved text
                946 \long\def\@sidebar#1{\bgroup\let\@vspace\@vspace@orig
                    \let\@vspacer\@vspacer@orig\captionsetup{type=sidebar}%
                948 \marginpar{\small#1}\egroup}
  marginfigure The marginfigure environment:
                949 \newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}
\@marginfigure The processing of the saved text
                950 \long\def\@marginfigure#1{\bgroup
                951 \let\@vspace\@vspace@orig
                952 \let\@vspacer\@vspacer@orig
                953 \captionsetup{type=figure}%
                954 \marginpar{\@Description@presentfalse\centering
                       \small#1\if@Description@present\else
                955
                         \global\@undescribed@imagestrue
                956
                         \ClassWarning{\@classname}{A possible image without description}
                957
                         \fi}%
                958
                959
                    \egroup}
   margintable The margintable environment:
                960 \newenvironment{margintable}{\Collect@Body\@margintable}{}
 \@margintable The processing of the saved text
                961 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
                962 \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
                963 \marginpar{\centering\small#1}\egroup}
                   SIGCHI extended abstracts provide 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
                964 \newdimen\fulltextwidth
                965 \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)
                966 \if@ACM@sigchiamode
                967 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
                968 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
                969 \let\@endfloatbox\@endwidefloatbox
                970 \def\@fpsadddefault{\def\@fps{tp}}%
                971 \@float}
                972∖fi
 \end@dblfloat And the end. Just adding a \bgroup.
                973 \if@ACM@sigchiamode
                974 \def\end@dblfloat{%
                       \end@float\egroup}
                975
                976\fi
```

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

```
977 \def\@endwidefloatbox{%
    \par\vskip\z@skip
978
     \@minipagefalse
979
    \outer@nobreak
980
981
    \egroup
982
     \color@endbox
     \global\setbox\@currbox=\vbox{\moveleft
984
      \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
985
    \wd\@currbox=\textwidth
986 }
```

3.15 Lists

```
987 \ifcase\ACM@format@nr
988 \relax % manuscript
989 \or % acmsmall
990 \or % acmlarge
991 \or % acmtog
992 \or % sigconf
993 \or % siggraph
994 \or % sigplan
995 \def\labelenumi{\theenumi.}
996 \def\labelenumii{\theenumii.}
997 \def\labelenumiii{\theenumiii.}
998 \def\labelenumiv{\theenumiv.}
999 \or % sigchi
1000 \or % sigchi-a
1001 \or % acmengage
1002 \or % acmcp
1003 \fi
```

The AMS uses generous margins for lists. Note that amsart defines \leftmargin values for list levels at the beginning of the document, so we must redefine them in the same manner. Also, note that amsart redefines the enumerate and itemize environments with a \makelabel command that uses \llap, so the \labelwidth value is (effectively) irrelevant; nonetheless, we follow amsart and set \labelwidth to \leftmargin minus \labelsep.

```
1004 \newdimen\@ACM@labelwidth
1005 \AtBeginDocument{%
     \setlength\labelsep{4pt}
1006
     \setlength{\@ACM@labelwidth}{6.5pt}
1007
1008
     %% First-level list: when beginning after the first line of an
1009
     %% indented paragraph or ending before an indented paragraph, labels
     %% should not hang to the left of the preceding/following text.
1011
     \setlength\leftmargini{\z@}
1012
     \addtolength\leftmargini{\parindent}
1013
     \addtolength\leftmargini{2\labelsep}
1014
     \addtolength\leftmargini{\@ACM@labelwidth}
1015
1016
1017
     %% Second-level and higher lists.
     \setlength\leftmarginii{\z@}
1018
     \addtolength\leftmarginii{0.5\labelsep}
```

```
\addtolength\leftmarginii{\@ACM@labelwidth}
                  1020
                        \setlength\leftmarginiii{\leftmarginii}
                  1021
                        \setlength\leftmarginiv{\leftmarginiii}
                  1022
                        \setlength\leftmarginv{\leftmarginiv}
                  1023
                        \setlength\leftmarginvi{\leftmarginv}
                  1024
                        \@listi}
                  1026 \newskip\listisep
                  1027 \listisep\smallskipamount
                  1028 \def\@listI{\leftmargin\leftmargini
                        \labelwidth\leftmargini \advance\labelwidth-\labelsep
                        \listparindent\z@
                        \topsep\listisep}
                  1031
                  1032 \let\@listi\@listI
                  1033 \def\@listii{\leftmargin\leftmarginii
                        \labelwidth\leftmarginii \advance\labelwidth-\labelsep
                        \topsep\z@skip}
                  1035
                  1036 \def\@listiii{\leftmargin\leftmarginiii
                        \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
                  1038 \def\@listiv{\leftmargin\leftmarginiv
                        \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
                  1040 \def\@listv{\leftmargin\leftmarginv
                  1041 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
                  1042 \def\@listvi{\leftmargin\leftmarginvi
                       \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
\descriptionlabel We do not use a colon by default like amsart does:
                  1044 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}
     \description Make the description environment indentation consistent with that of the itemize
                  and enumerate environments.
                  1045 \renewenvironment{description}{\list{}{%
                          \labelwidth\@ACM@labelwidth
                  1046
                          \let\makelabel\descriptionlabel}%
                  1047
                  1048 }{
                        \endlist
                  1049
                  1050 }
                  1051 \let\enddescription=\endlist % for efficiency
                          Top-matter data
```

\if@ACM@maketitle@typeset The switch to check whether \maketitle is already typeset. It is initally false, and setting top matter when it is true is wrong.

```
1052 \newif\if@ACM@maketitle@typeset
1053 \@ACM@maketitle@typesetfalse
```

We use the xkeyval interface to define journal titles and the relevant information

```
1054 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
1055 ACMJCSS,%
1056 CIE,%
1057 CSUR,%
1058 DGOV,%
1059 DLT,%
1060 DTRAP.%
1061 FAC,%
```

- GAMES,% 1062
- HEALTH,% 1063
- IMWUT,% 1064
- JACM,% 1065
- JATS,% 1066
- 1067 JDIQ,%
- 1068 JDS,%
- JEA,% 1069
- JERIC,%
- 1070 1071 JETC,%
- JOCCH,% 1072
- JRC,% 1073
- PACMCGIT,% 1074
- 1075 PACMHCI,%
- 1076 PACMMOD,%
- 1077 PACMNET,%
- 1078 PACMPL,%
- PACMSE,% 1079
- POMACS,% 1080
- TAAS,% 1081
- TACCESS,% 1082
- TACO,% 1083
- TALG,% 1084
- TALLIP,% 1085
- TAP,% 1086
- 1087 TCPS,%
- TDS,% 1088
- TEAC,% 1089
- TECS,% 1090
- TELO,% 1091
- THRI,%
- 1092
- TIIS,% 1093
- TIOT,% 1094 1095 TISSEC,%
- 1096 TIST,%
- 1097 TKDD,%
- 1098 TMIS,%
- 1099 TOCE,%
- TOCHI,% 1100
- TOCL,%
- 1101
- TOCS,% 1102
- TOCT,% 1103 TODAES,%
- 1104
- TODS,% 1105
- TOG,% 1106 TOIS,% 1107
- TOIT,% 1108
- 1109 TOMACS,%
- 1110 TOMM,%
- 1111 TOMPECS,% 1112 TOMS,%
- TOPC,% 1113
- TOPS,% 1114
- TOPLAS,% 1115

```
TOPML.%
1116
     TORS,%
1117
    TOS,%
1118
    TOSEM,%
1119
1120 TOSN,%
1121 TQC,%
1122 TRETS,%
1123 TSAS,%
1124 TSC,%
    TSLP,%
1125
     TWEB.%
1126
     FACMP%
1127
1128 }{%
1129 \ifcase\@journalCode@nr
1130 \relax % ACMJCSS
     \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
     \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
     \def\@permissionCodeOne{2834-5533}%
1133
1134 \or % CIE
     \def\@journalName{ACM Computers in Entertainment}%
1135
     \def\@journalNameShort{ACM Comput. Entertain.}%
1136
     \def\@permissionCodeOne{1544-3574}%
1137
1138 \or % CSUR
     \def\@journalName{ACM Computing Surveys}%
1139
     \def\@journalNameShort{ACM Comput. Surv.}%
1140
     \def\@permissionCodeOne{0360-0300}%
1141
1142 \or % DGOV
     \def\@journalName{Digital Government: Research and Practice}%
     \def\@journalNameShort{Digit. Gov. Res. Pract.}%
     \def\@permissionCodeOne{2639-0175}%
1145
1146 \or % DLT
     \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
     \def\@journalNameShort{Distrib. Ledger Technol.}%
1148
     \def\@permissionCodeOne{2769-6472}%
1149
1150 \or % DTRAP
     \def\@journalName{Digital Threats: Research and Practice}%
1151
     \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1152
     \def\@permissionCodeOne{2576-5337}%
1154 \or % FAC
     \def\@journalName{Formal Aspects of Computing}%
1155
     \def\@journalNameShort{Form. Asp. Comput.}%
1156
     \def\@permissionCodeOne{0934-5043}%
1157
     \def\@permissionCodeTwo{1433-299X}%
1158
1159 \or % GAMES
     \def\@journalName{ACM Games: Research and Practice}%
1160
     \def\@journalNameShort{ACM Games}%
1161
     \def\@permissionCodeOne{2832-5516}%
1162
1163 \or % HEALTH
     \def\@journalName{ACM Transactions on Computing for Healthcare}%
1164
     \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1166
     \def\@permissionCodeOne{2637-8051}%
1167 \or % IMWUT
     \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1168
       Wearable and Ubiquitous Technologies}%
```

1169

```
\def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1170
     \def\@permissionCodeOne{2474-9567}%
1171
     \@ACM@screentrue
1172
    \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1173
1174\or % JACM
     \def\@journalName{Journal of the ACM}%
     \def\@journalNameShort{J. ACM}%
     \def\@permissionCodeOne{0004-5411}%
1178 \or % JATS
1179
     \def\@journalName{Journal on Autonomous Transportation Systems}%
1180
     \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
     \def\@permissionCodeOne{2833-0528}%
1181
1182 \or % JDIC
     \def\@journalName{ACM Journal of Data and Information Quality}%
1183
     \def\@journalNameShort{ACM J. Data Inform. Quality}%
1184
     \def\@permissionCodeOne{1936-1955}%
1185
1186 \or % JDS
     \def\@journalName{ACM/IMS Journal of Data Science}%
     \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1188
     \def\@permissionCodeOne{2831-3194}%
1189
     \def\@permissionCodeTwo{2831-3194}%
1190
1191 \or % JEA
     \def\@journalName{ACM Journal of Experimental Algorithmics}%
1192
     \def\@journalNameShort{ACM J. Exp. Algor.}%
1193
     \def\@permissionCodeOne{1084-6654}%
1194
1195 \or % JERIC
     \def\@journalName{ACM Journal of Educational Resources in Computing}%
     \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
     \def\@permissionCodeOne{1073-0516}%
1199 \or % JETC
1200 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
     \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1201
     \def\@permissionCodeOne{1550-4832}%
1202
1203 \or % JOCCH
     \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1204
     \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1205
     \def\@permissionCodeOne{1556-4673}%
1206
     \def\@permissionCodeTwo{1556-4711}%
1208 \or % JRC
     \def\@journalName{ACM Journal on Responsible Computing}%
1209
     \def\@journalNameShort{ACM J. Responsib. Comput.}%
1210
     \def\@permissionCodeOne{2832-0565}%
1211
1212 \or % PACMCGIT
    \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1213
     \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1214
     \def\@permissionCodeOne{2577-6193}%
1215
1216
     \@ACM@screentrue
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1218 \or % PACMHCI
     \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1220
     \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
     \def\@permissionCodeOne{2573-0142}%
1221
```

\PackageInfo{\@classname}{Using screen mode due to \@journalCode}%

\@ACM@screentrue

1222

```
1224 \or % PACMMOD
     \def\@journalName{Proceedings of the ACM on Management of Data}%
1225
     \def\@journalNameShort{Proc. ACM Manag. Data}%
1226
     \def\@permissionCodeOne{2836-6573}%
1227
1228 \or % PACMNET
     \def\@journalName{Proceedings of the ACM on Networkng}%
     \def\@journalNameShort{Proc. ACM Netw.}%
     \def\@permissionCodeOne{2834-5509}%
1232 \or % PACMPL
     \def\@journalName{Proceedings of the ACM on Programming Languages}%
1233
     \def\@journalNameShort{Proc. ACM Program. Lang.}%
1234
     \def\@permissionCodeOne{2475-1421}%
1235
     \@ACM@screentrue
1236
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1237
1238 \or % PACMSE
     \def\@journalName{Proceedings of the ACM on Software Engineering}%
1239
     \def\@journalNameShort{Proc. ACM Softw. Eng.}%
     \def\@permissionCodeOne{2994-970X}%
     \@ACM@screentrue
1242
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1243
1244 \or % POMACS
    \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1245
     \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1246
     \def\@permissionCodeOne{2476-1249}%
1247
     \@ACM@screentrue
1248
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1249
     \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
     \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
     \def\@permissionCodeOne{1556-4665}%
1253
1254 \or % TACCESS
     \def\@journalName{ACM Transactions on Accessible Computing}%
1255
     \def\@journalNameShort{ACM Trans. Access. Comput.}%
1256
     \def\@permissionCodeOne{1936-7228}%
1257
1258 \or % TACO
     \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1259
     \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1260
     \def\@permissionCodeOne{1544-3566}%
     \def\@permissionCodeTwo{1544-3973}%
1263 \or % TALG
     \def\@journalName{ACM Transactions on Algorithms}%
1264
1265
     \def\@journalNameShort{ACM Trans. Algor.}%
     \def\@permissionCodeOne{1549-6325}%
1266
1267 \or % TALLIP
    \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1268
     \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1269
     \def\@permissionCodeOne{2375-4699}%
1270
     \def\@journalName{ACM Transactions on Applied Perception}%
     \def\@journalNameShort{ACM Trans. Appl. Percept.}%
     \def\@permissionCodeOne{1544-3558}%
1275 \or % TCPS
     \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1276
```

\def\@journalNameShort{ACM Trans. Cyber-Phys. Syst.}%

```
\def\@permissionCodeOne{2378-962X}%
1278
1279 \or % TDS
     \def\@journalName{ACM/IMS Transactions on Data Science}%
1280
     \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1281
     \def\@permissionCodeOne{2577-3224}%
1282
1283 \or % TEAC
     \def\@journalName{ACM Transactions on Economics and Computation}%
     \def\@journalNameShort{ACM Trans. Econ. Comput.}%
     \def\@permissionCodeOne{2167-8375}%
1286
1287 \or % TECS
1288
     \def\@journalName{ACM Transactions on Embedded Computing Systems}%
     \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1289
     \def\@permissionCodeOne{1539-9087}%
1290
1291 \or % TELO
     \def\@journalName{ACM Transactions on Evolutionary Learning}%
1292
     \def\@journalNameShort{ACM Trans. Evol. Learn.}%
1293
     \def\@permissionCodeOne{2688-3007}%
1295 \or % THRI
     \def\@journalName{ACM Transactions on Human-Robot Interaction}%
1296
     \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1297
     \def\@permissionCodeOne{2573-9522}%
1298
1299 \or % TIIS
     \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1300
     \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1301
     \def\@permissionCodeOne{2160-6455}%
1302
1303 \or % TIOT
     \def\@journalName{ACM Transactions on Internet of Things}%
     \def\@journalNameShort{ACM Trans. Internet Things}%
     \def\@permissionCodeOne{2577-6207}%
1307 \or % TISSEC
     \def\@journalName{ACM Transactions on Information and System Security}%
1308
     \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1309
     \def\@permissionCodeOne{1094-9224}%
1310
1311 \or % TIST
     \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1312
     \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1313
     \def\@permissionCodeOne{2157-6904}%
1314
1315 \or % TKDD
     \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
     \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1317
     \def\@permissionCodeOne{1556-4681}%
1318
1319 \or % TMIS
     \def\@journalName{ACM Transactions on Management Information Systems}%
1320
     \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1321
     \def\@permissionCodeOne{2158-656X}%
1322
1323 \or % TOCE
     \def\@journalName{ACM Transactions on Computing Education}%
1324
     \def\@journalNameShort{ACM Trans. Comput. Educ.}%
     \def\@permissionCodeOne{1946-6226}%
1327 \or % TOCHI
1328
     \def\@journalName{ACM Transactions on Computer-Human Interaction}%
     \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1329
     \def\@permissionCodeOne{1073-0516}%
1330
```

1331 \or % TOCL

```
\def\@journalName{ACM Transactions on Computational Logic}%
1332
     \def\@journalNameShort{ACM Trans. Comput. Logic}%
1333
     \def\@permissionCodeOne{1529-3785}%
1334
1335 \or % TOCS
     \def\@journalName{ACM Transactions on Computer Systems}%
1336
     \def\@journalNameShort{ACM Trans. Comput. Syst.}%
     \def\@permissionCodeOne{0734-2071}%
1339 \or % TOCT
     \def\@journalName{ACM Transactions on Computation Theory}%
1340
     \def\@journalNameShort{ACM Trans. Comput. Theory}%
1341
     \def\@permissionCodeOne{1942-3454}%
1342
1343 \or % TODAES
    \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1344
     \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1345
     \def\@permissionCodeOne{1084-4309}%
1346
1347 \or % TODS
     \def\@journalName{ACM Transactions on Database Systems}%
     \def\@journalNameShort{ACM Trans. Datab. Syst.}%
     \def\@permissionCodeOne{0362-5915}%
1350
1351 \or % TOG
     \def\@journalName{ACM Transactions on Graphics}%
1352
     \def\@iournalNameShort{ACM Trans. Graph.}%
1353
     \def\@permissionCodeOne{0730-0301}
1354
1355 \or % TOIS
     \def\@journalName{ACM Transactions on Information Systems}%
1356
     \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1357
     \def\@permissionCodeOne{1046-8188}%
1359 \or % TOIT
     \def\@journalName{ACM Transactions on Internet Technology}%
     \def\@journalNameShort{ACM Trans. Internet Technol.}%
1361
     \def\@permissionCodeOne{1533-5399}%
1362
1363 \or % TOMACS
     \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1364
     \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1365
     \def\@permissionCodeOne{1049-3301}%
1366
     \def\@permissionCodeTwo{1558-1195}%
1367
1368 \or % TOMM
    \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
     \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
     \def\@permissionCodeOne{1551-6857}%
1371
     \def\@permissionCodeTwo{1551-6865}%
1372
1373 \or % TOMPECS
    \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1374
     \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1375
     \def\@permissionCodeOne{2376-3639}%
1376
1377 \or % TOMS
     \def\@journalName{ACM Transactions on Mathematical Software}%
1378
     \def\@journalNameShort{ACM Trans. Math. Softw.}%
     \def\@permissionCodeOne{0098-3500}%
1380
1381 \or % TOPC
1382
     \def\@journalName{ACM Transactions on Parallel Computing}%
     \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1383
```

\def\@permissionCodeOne{2329-4949}%

\def\@permissionCodeTwo{2329-4957}%

1384

1385

```
1386 \or % TOPS
     \def\@journalName{ACM Transactions on Privacy and Security}%
     \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1388
     \def\@permissionCodeOne{2471-2566}%
1389
1390 \or % TOPLAS
     \def\@journalName{ACM Transactions on Programming Languages and Systems}%
     \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
     \def\@permissionCodeOne{0164-0925}%
1394 \or % TOPML
1395
     \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1396
     \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
     \def\@permissionCodeOne{2836-8924}%
1397
1398 \or % TORS
     \def\@journalName{ACM Transactions on Recommender Systems}%
1399
     \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1400
     \def\@permissionCodeOne{2770-6699}%
1401
     \def\@journalName{ACM Transactions on Storage}%
     \def\@journalNameShort{ACM Trans. Storage}%
1404
     \def\@permissionCodeOne{1553-3077}%
1405
1406 \or % TOSEM
    \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1407
     \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1408
     \def\@permissionCodeOne{1049-331X}%
1409
1410 \or % TOSN
     \def\@journalName{ACM Transactions on Sensor Networks}%
1411
     \def\@journalNameShort{ACM Trans. Sensor Netw.}%
     \def\@permissionCodeOne{1550-4859}%
     \def\@journalName{ACM Transactions on Quantum Computing}%
     1416
     \def\@permissionCodeOne{2643-6817}%
1417
1418 \or % TRFTS
    \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
     \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1420
     \def\@permissionCodeOne{1936-7406}%
1421
1422 \or % TSAS
     \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
     \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
     \def\@permissionCodeOne{2374-0353}%
1425
1426 \or % TSC
     \def\@journalName{ACM Transactions on Social Computing}%
1427
     \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1428
     \def\@permissionCodeOne{2469-7818}%
1429
1430 \or % TSLP
     \def\@journalName{ACM Transactions on Speech and Language Processing}%
1431
     \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1432
     \def\@permissionCodeOne{1550-4875}%
1434 \or % TWEB
     \def\@journalName{ACM Transactions on the Web}%
1436
     \def\@journalNameShort{ACM Trans. Web}%
1437
     \def\@permissionCodeOne{1559-1131}%
1438 \else % FACMP, a dummy journal
```

\def\@journalName{ACM Just Accepted}%

```
\def\@journalNameShort{ACM Accepted}%
                1440
                     \def\@permissionCodeOne{XXXX-XXXX}%
                1441
                1442\fi
                1443 \ClassInfo{\@classname}{Using journal code \@journalCode}%
                1444 }{%
                     \ClassError{\@classname}{Incorrect journal #1}%
    \acmJournal And the syntactic sugar around it
                1447 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
                     \global\@ACM@journal@bibstriptrue}
                   The defaults:
                1449 \def\@journalCode@nr{0}
                1450 \def\@journalName{}%
                1451 \def\@journalNameShort{\@journalName}%
                1452 \def\@permissionCodeOne{XXXX-XXXX}%
                1453 \def\@permissionCodeTwo{}%
 \acmConference This is the conference command
                1454 \newcommand\acmConference[4][]{%
                     \gdef\acmConference@shortname{#1}%
                1455
                     \gdef\acmConference@name{#2}%
                1456
                     \gdef\acmConference@date{#3}%
                1457
                     \gdef\acmConference@venue{#4}%
                1458
                     \ifx\acmConference@shortname\@empty
                1459
                       \gdef\acmConference@shortname{#2}%
                1460
                1461
                     \global\@ACM@journal@bibstripfalse
                1462
                     \ifx\@acmBooktitle\@empty\relax
                1464
                       \acmBooktitle{Proceedings of \acmConference@name
                          \ifx\acmConference@name\acmConference@shortname\else
                1465
                          \ (\acmConference@shortname)\fi}%
                1466
                     \fi
                1467
                1468 }
                1469 \if@ACM@journal\else
                1470 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
                1471 DC, USA}%
                1472 \fi
  \acmBooktitle The book title of the conference:
 1474 \acmBooktitle{}
\@editorsAbbrev How to abbreviate editors
                1475 \def\@editorsAbbrev{(Ed.)}
   \@acmEditors The list of editors
                1476 \def\@acmEditors{}
       \editor Add a new editor to the list
                1477 \def\editor#1{\ifx\@acmEditors\@empty
                       \gdef\@acmEditors{#1}%
                1478
```

```
1479
                             \else
                               \gdef\@editorsAbbrev{(Eds.)}%
                       1480
                               \g@addto@macro\@acmEditors{\and#1}%
                       1481
                       1482 \fi}
            \subtitle The subtitle macro
                       1483 \def\subtitle#1{\def\@subtitle{#1}}
                       1484 \subtitle{}
    \num@authorgroups The total number of "groups". Each group is several authors with the same affiliations(s)
                       1485 \newcount\num@authorgroups
                       1486 \num@authorgroups=0\relax
         \num@authors The total number of authors
                       1487 \newcount\num@authors
                       1488 \num@authors=0\relax
\if@insideauthorgroup Whether we are continuing an author group
                       1489 \newif\if@insideauthorgroup
                       1490 \@insideauthorgroupfalse
```

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

Note that we want to typeset the link to the author's orcid if known. The problem is, we know the orcid only after the author is entered. The trick is based on the idea that \csname...\endcsname is \relax unless defined. Therefore we typeset authors by the special macro \csname typeset@author\the\num@authors\endcsname, which is defined by \orcid command.

```
1491 \renewcommand\author[2][]{%
    1492
        authors in the same \string\author\space macro!}}{}%
1493
     \global\advance\num@authors by 1\relax
1494
1495
    \if@insideauthorgroup\else
      \global\advance\num@authorgroups by 1\relax
1496
      \global\@insideauthorgrouptrue
1497
    \fi
1498
     \ifx\addresses\@empty
1499
      \if@ACM@anonymous
1500
        \gdef\addresses{\@author{Anonymous Author(s)%
1501
          \ifx\@acmSubmissionID\@empty\else\\Submission Id:
1502
1503
            \@acmSubmissionID\fi}}%
1504
        \gdef\authors{Anonymous Author(s)}%
1505
        \expandafter\gdef\expandafter\addresses\expandafter{%
1506
1507
          \expandafter\@author\expandafter{%
            1508
        \gdef\authors{#2}%
1509
      \fi
1510
    \else
1511
      \if@ACM@anonymous\else
1512
      \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1513
        \expandafter\and\expandafter\@author\expandafter{%
1514
          \csname typeset@author\the\num@authors\endcsname{#2}}}%
1516
        \g@addto@macro\authors{\and#2}%
```

```
\fi
                                1517
                                      \fi
                                1518
                                      \if@ACM@anonymous
                                1519
                                        \ifx\shortauthors\@empty
                                1520
                                          \gdef\shortauthors{Anon.
                                1521
                                            \ifx\@acmSubmissionID\@empty\else Submission Id:
                                1522
                                            \@acmSubmissionID\fi}%
                                 1523
                                        \fi
                                 1524
                                 1525
                                      \else
                                        \def\ensuremath{\def}{\#1}%
                                1526
                                        \ifx\@tempa\@empty
                                1527
                                          \ifx\shortauthors\@empty
                                1528
                                            \gdef\shortauthors{#2}%
                                1529
                                          \else
                                 1530
                                            \g@addto@macro\shortauthors{\and#2}%
                                 1531
                                          \fi
                                 1532
                                 1533
                                          \ifx\shortauthors\@empty
                                 1534
                                 1535
                                            \gdef\shortauthors{#1}%
                                 1536
                                          \else
                                            \g@addto@macro\shortauthors{\and#1}%
                                 1537
                                          \fi
                                1538
                                        \fi
                                1539
                                      \fi}
                                1540
                   \affiliation The macro \affiliation mimics \address from amsart. Note that it has an optional
                                argument, which we use differently from amsart.
                                 1541 \newcommand{\affiliation}[2][]{%
                                      \global\@insideauthorgroupfalse
                                 1543
                                      \if@ACM@anonymous\else
                                        \g@add to @macro \addresses {\affiliation {\#1}{\#2}} \%
                                 1544
                                      \fi}
                                 1545
ACM@affiliation@obeypunctuation Whether to use the author's punctuation (false by default, which adds American-style
                                address punctuation)
                                 1546 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
                                1547 [true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}
         \additionalaffiliation Additional affiliations go to footnotes
                                 \@additionalaffiliation Process \additionalaffiliation inside \authornote
                                 1549 \def\@additionalaffiliation#1{\bgroup
                                      \def\position##1{\ignorespaces}%
                                      \def\institution##1{##1\ignorespaces}%
                                 1551
                                 1552
                                      \def\department{\@ifnextchar[{\@department}{\@department[]}}%
                                 1553
                                      \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
                                 1554
                                      \let\streetaddress\position
                                      \let\city\position
                                1555
                                      \let\state\position
                                1556
                                      \let\postcode\position
                                1557
                                      \let\country\position
                                1558
                                      Also with #1\unskip.\egroup}
```

```
\email The macro \email mimics \email from amsart. Again, it has an optional argument that
                       we do not currently need but keep for possible future use.
                       1560 \renewcommand{\email}[2][]{%
                            1561
                                addresses in the same \string\email\space macro!}}{}%
                       1562
                            \if@ACM@anonymous\else
                       1563
                              \g@addto@macro\addresses{\email{#1}{\#2}}\%
                       1564
                            \fi}
                       1565
                \orcid We redefine the command to typeset the current author
                       1566 \def\orcid#1{\unskip\ignorespaces%
                            \IfBeginWith{#1}{http}{%
                       1567
                              \expandafter\gdef\csname
                       1568
                                  typeset@author\the\num@authors\endcsname##1{%
                       1569
                                    \href{#1}{##1}}}{%
                       1570
                       1571
                              \expandafter\gdef\csname
                                  typeset@author\the\num@authors\endcsname##1{%
                       1573
                                    \href{https://orcid.org/#1}{##1}}}
     \authorsaddresses Setting up authors' addresses
                       1575 \authorsaddresses{\@mkauthorsaddresses}
\@mktranslatedkeywords We have two argument: the language to typeset keywords and the keywords.
                       1576 \newcommand\@mktranslatedkeywords[2]{\bgroup
                            \selectlanguage{#1}%
                            {\@specialsection{\keywordsname}%
                       1578
                              \noindent#2\par}\egroup}
                       1579
          \@titlenotes The title notes
                       1580 \def\@titlenotes{}
            \titlenote Adding a note to the title
                       1581 \def\titlenote#1{%
                            \g@addto@macro\@title{\footnotemark}%
                       1582
                            \if@ACM@anonymous
                       1583
                              \verb|\g@addto@macro|@titlenotes{%|}
                       1584
                                \stepcounter{footnote}\footnotetext{Title note}}%
                       1585
                            \else
                       1586
                       1587
                              \label{lem:lemotes} $$  \g@add to @macro \etitle notes {\step counter {footnote} \footnote text{#1}}% $$
                       1588
                            \fi}
      \@subtitlenotes The subtitle notes
                       1589 \def\@subtitlenotes{}
         \subtitlenote Adding a note to the subtitle
                       1590 \def\subtitlenote#1{%
                            \g@addto@macro\@subtitle{\footnotemark}%
                       1591
                            \if@ACM@anonymous
                       1592
                              \g@addto@macro\@subtitlenotes{%
                       1593
                                \stepcounter{footnote}\footnotetext{Subtitle note}}%
                       1594
                            \else
                       1595
                              \g@addto@macro\@subtitlenotes{%
                       1596
```

```
\stepcounter{footnote}\footnotetext{#1}}%
                 1597
                      \fi}
                 1598
  \@authornotes The author notes
                 1599 \def\@authornotes{}
    \authornote Adding a note to the author
                 1600 \def\authornote#1{%
                 1601
                      \if@ACM@anonymous\else
                         \g@addto@macro\addresses{\@authornotemark}%
                        \verb|\g@addto@macro||@authornotes||%|
                           \stepcounter{footnote}\footnotetext{#1}}%
                 1604
                 1605
                      \fi}
\authornotemark Adding a footnote mark to the authors
                 1606 \newcommand\authornotemark[1][\relax]{%
                      \ifx#1\relax\relax\relax
                      \g@addto@macro\addresses{\@authornotemark}%
                      \else
                      \g@addto@macro\addresses{\@@authornotemark{\#1}}\%
                 1610
                 1611
                      \fi}
     \acmVolume The current volume
                 1612 \def\acmVolume#1{\def\@acmVolume{#1}}
                 1613 \acmVolume{1}
     \acmNumber The current number
                 1614 \def\acmNumber#1{\def\@acmNumber{#1}}
                 1615 \acmNumber{1}
    \acmArticle The current article
                 1616 \def\acmArticle#1{\def\@acmArticle{#1}}
                 1617 \acmArticle{}
 \acmArticleSeq The sequence number
                 1618 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
                 1619 \acmArticleSeq{\@acmArticle}
       \acmYear The current year
                 1620 \def\acmYear#1{\def\@acmYear{#1}}
                 1621 \acmYear{\the\year}
      \arrowvert \acmMonth The current month
                 1622 \def\acmMonth#1{\def\@acmMonth{#1}}
                 1623 \acmMonth{\the\month}
   \@acmPubDate The publication date
                 1624 \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}
                 1627
```

```
\acmPrice The price—obsolete
                  is obsolete. ACM no longer prints the price in bibstrip.}}
\acmSubmissionID The submission ID
                  1630 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
                  1631 \acmSubmissionID{}
        \acmISBN The book ISBN
                 1632 \def\acmISBN#1{\def\@acmISBN{#1}}
                  1633 \acmISBN{978-x-xxxx-xxxx-x/YY/MM}
         \acmDOI The paper DOI
                 1634 \ensuremath{\texttt{Mef}@acmDOI{#1}}
                 1635 \acmDOI{10.1145/nnnnnnn.nnnnnnn}
   \if@ACM@badge
\@ACM@badge@width The width of the badge
                 1636 \newlength\@ACM@badge@width
                 1637 \setlength\@ACM@badge@width{3pc}
\@ACM@title@width The width of the title
                 1638 \newlength\@ACM@title@width
\@ACM@badge@skip The spacing between badges
                  1639 \newlength\@ACM@badge@skip
                  1640 \setlength\@ACM@badge@skip{1pt}
     \@acmBadgeR
                 1641 \def\@acmBadgeR{}
     \@acmBadgeL
                 1642 \def\@acmBadgeL{}
      \acmBadgeR Setting the right badge
                 1643 \newcommand\acmBadgeR[2][]{%
                       \ifx\@acmBadgeR\@empty
                 1644
                         \gdef\@acmBadgeR{%
                 1645
                           \smash{%
                 1646
                 1647
                             \raisebox{0.5}height}{%}
                               \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}%
                 1648
                 1649
                       \else
                         \g@addto@macro{\@acmBadgeR}{%
                 1650
                           \hspace{\@ACM@badge@skip}%
                 1651
                           \smash{%
                 1652
                             \raisebox{0.5\height}{%
                 1653
                               \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}%
                 1654
                      \fi}
                  1655
```

```
\acmBadgeL Setting the left badge
               1656 \newcommand\acmBadgeL[2][]{%
                    \ifx\@acmBadgeL\@empty
               1657
                      \gdef\@acmBadgeL{%
               1658
                        \smash{%
               1659
               1660
                          \raisebox{0.5\height}{%
               1661
                            \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}%
               1662
                    \else
                      \g@addto@macro{\@acmBadgeL}{%
               1663
                        \hspace{\@ACM@badge@skip}%
               1664
                        \smash{%
               1665
                          1666
                            1667
                    \fi}
               1668
     \acmBadge Just a syntax sugar for \acmBadgeR
               1669 \let\acmBadge=\acmBadgeR
    \startPage The start page of the paper
               1670 \def\startPage#1{\def\@startPage{#1}}
               1671 \startPage{}
        \terms Terms are obsolete. We use CCS now.
               1672 \ensuremath{\classWarning{\classname}{The command \string\terms{}} is}
                      obsolete. I am going to ignore it}}
     \keywords Keywords are mostly obsolete. We use CCS now. Still it makes sense to keep them for
               compatibility.
               1674 \def\keywords#1{\def\@keywords{#1}}
               1675 \let\@keywords\@empty
               1676 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
                    \ifnum\getrefnumber{TotPages}>2\relax
                    \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
               1678
                      for papers over two pages}%
               1679
                    \fi\fi\fi}
               1680
     abstract The amsart package puts abstract in a box. Since we do not know whether we will
               use two-column mode, we prefer to save the text
               1681 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
\@saveabstract And saving the abstract
               {\tt 1682 \ long\ def\ @saveabstract\#1{\tt if@ACM@maketitle@typeset}}
                    \ClassError{\@classname}{Abstract must be defined before maketitle
                      command. Please move it!}\fi
               1684
               1685 \long\gdef\@abstract{#1}}
               1686 \@saveabstract{}
     \@lempty The long version of \@empty (to compare with \@abstract)
               1687 \long\def\@lempty{}
```

```
\if@ACM@printccs Whether to print CCS
                    1688 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
                         \if@ACM@printccs
                    1689
                           \ClassInfo{\@classname}{Printing CCS}%
                    1690
                    1691
                    1692
                           \ClassInfo{\@classname}{Suppressing CCS}%
                        fi}{\classError{\ensuremath{\classError}{\classname}}}
\if@ACM@printacmref Whether to print the ACM bibstrip
                    1694 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
                         \if@ACM@printacmref
                           \ClassInfo{\@classname}{Printing bibformat}%
                    1696
                    1697
                         \else
                    1698
                           \ClassInfo{\@classname}{Suppressing bibformat}%
                        fi}{\classError{\classname}{\classname}}
                    1699
                    1700 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
                         \ifnum\getrefnumber{TotPages}>1\relax
                         \ClassWarningNoLine{\@classname}{%
                           ACM reference format is mandatory \MessageBreak
                    1703
                           for papers over one page. \MessageBreak
                    1704
                           Please add printacmref=true to the \MessageBreak
                    1705
                           \string\settopmatter\space command.}%
                    1706
                         \fi\fi\fi}
                    1707
\if@ACM@printfolios Whether to print folios
                    1708 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
                         \if@ACM@printfolios
                    1709
                           \ClassInfo{\@classname}{Printing folios}%
                    1710
                    1711
                         \else
                           \ClassInfo{\@classname}{Suppressing folios}%
                    1712
                    1713 \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}
\@ACM@authorsperrow The number of authors per row. 0 means use the default algorithm.
                    1714 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrow}[0]{%
                         \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
                    1715
                             #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
                    1716
                             numerical. Ignoring the input #1\del{acm@authorsperrow{0}}
                    1717
      \settopmatter The usual syntactic sugar
                    1718 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
                       Now the settings
                    1719 \settopmatter{printccs=true, printacmref=true}
                    1720 \if@ACM@manuscript
                    1721 \settopmatter{printfolios=true}
                    1722 \else
                    1723 \if@ACM@journal
                           \settopmatter{printfolios=true}
                    1724
                    1725
                         \else
                           \settopmatter{printfolios=false}
                    1726
                         \fi
                    1727
                    1728 \fi
                    1729 \settopmatter{authorsperrow=0}
```

```
\@received The container for the paper history
                   1730 \def\@received{}
        \received The \received command
                   1731 \newcommand\received[2][]{\def\@tempa{#1}%
                   1732
                        \ifx\@tempa\@empty
                   1733
                          \ifx\@received\@empty
                   1734
                            \gdef\@received{Received #2}%
                   1735
                          \else
                            \g@addto@macro{\@received}{; revised #2}%
                          \fi
                   1737
                   1738
                        \else
                          \ifx\@received\@empty
                   1739
                            \gdef\@received{#1 #2}%
                   1740
                          \else
                   1741
                            \g@addto@macro{\@received}{; #1 #2}%
                   1742
                          \fi
                   1743
                       \fi}
                   1744
                   1745 \AtEndDocument{%
                        \ifx\@received\@empty\else
                   1747
                          \par\bigskip\noindent\small\normalfont\@received\par
                   1748
                        \fi}
 \acmArticleType Article type. We set up the color.
                   1749 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
                        Research,Review,Discussion,Invited,Position}[Review]{%
                        \ifcase\ACM@ArticleType@nr
                   1751
                        \relax % Research
                   1752
                            \colorlet{@ACM@Article@color}{ACMBlue}%
                   1753
                        \or % Review
                   1754
                            \colorlet{@ACM@Article@color}{ACMOrange}%
                   1755
                   1756
                        \or % Discussion
                            \colorlet{@ACM@Article@color}{ACMGreen}%
                   1757
                   1758
                        \or % Invited
                            \colorlet{@ACM@Article@color}{ACMPurple}%
                   1759
                        \or % Position
                   1760
                            \colorlet{@ACM@Article@color}{ACMRed}%
                   1761
                        \fi
                   1762
                   1763 }{%
                   1764 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
                         Discussion, Invited, or Position}}
                   1766 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
                   1767 \if@ACM@acmcp
                   1768 \acmArticleType{Research}%
                   1769 \fi
                   1770
\@ACM@color@frame The colored frame for the acmcp
                   1771 \newenvironment{@ACM@color@frame}{%
                        \def\FrameCommand{\hspace*{-6.5pc}%
                   1772
                          \colorbox{@ACM@Article@color!10!white}}%
                   1773
                        \MakeFramed {\advance\hsize
                   1774
                          -6.5pc\relax\FrameRestore}}{\zsaveposy{@ACM@acmcpframe@y}%
                   1775
                   1776
                       \endMakeFramed}
```

```
\acmCodeDataLink The code link
                 1777 \def\acmCodeLink#1{%
                 1778
                      \ifx\@acmCodeDataLink\@empty
                          \gdef\@acmCodeDataLink{\url{#1}}%
                      \else
                          1782
                      \fi}
                 1783 \def\@acmCodeDataLink{}
\acmContributions The authors' contrubution statement
                 1784 \def\acmContributions#1{\gdef\@acmContributions{#1}}
                 1785 \acmContributions{}
    \acmDataLink The code link
                 1786 \let\acmDataLink\acmCodeLink
                        Concepts system
                 We exclude CCSXML stuff generated by the ACM system:
                 1787 \RequirePackage{comment}
                 1788 \excludecomment{CCSXML}
      \@concepts This is the storage macro and counter for concepts
                 1789 \let\@concepts\@empty
                 1790 \newcounter{@concepts}
        \ccsdesc The first argument is the significance, the second is the concept(s)
                 1791 \newcommand\ccsdesc[2][100]{%
                 1792 \ccsdesc@parse#1~#2~~\ccsdesc@parse@end}
  \ccsdesc@parse The parser of the expression Significance~General~Specific (we need textcomp for
                 \textrightarrow). Note that Specific can be empty!
                 1793 \def\textrightarrow{$\rightarrow$}
                 1794 \def\ccsdesc@parse#1~#2~#3~{%
                       \stepcounter{@concepts}%
                       \expandafter\ifx\csname CCS@General@#2\endcsname\relax
                 1796
                 1797
                         \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
                 1798
                           \textbf{#2}}%
                         \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
                 1799
                         \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
                 1800
                       \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
                 1801
                         \csname CCS@Punctuation@#2\endcsname
                 1802
                         \csname CCS@Specific@#2\endcsname}%
                 1803
                 1804
                       \ifx#3\relax\relax\else
                 1805
                         \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
                 1806
                           \textrightarrow\ }%
                 1807
                       \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
                 1808
                 1809
                          \addtocounter{@concepts}{-1}%
                          1810
                          1811
                          #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
                 1812
                      \fi
                 1813
                 1814 \ccsdesc@parse@finish}
```

```
1815 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
                           \ifnum\getrefnumber{TotPages}>2\relax
                      1816
                           \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
                      1817
                      1818
                              for papers over two pages}%
                          \fi\fi\fi}
                      1819
\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
                      1820 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
                             Copyright system
                      This is from acmcopyright.sty
  \if@printcopyright Whether to print a copyright symbol
                      1821 \newif\if@printcopvright
                      1822 \@printcopyrighttrue
\if@printpermission Whether to print the permission block
                      1823 \newif\if@printpermission
                      1824 \@printpermissiontrue
        \if@acmowned Whether the ACM owns the rights to the paper
                      1825 \newif\if@acmowned
                      1826 \@acmownedtrue
                         Keys:
                      1827 \define@choicekey*{ACM@}{acmcopyrightmode}[%
                           \acm@copyrightinput\acm@copyrightmode]{none,%
                      1828
                             acmcopyright,acmlicensed,rightsretained,%
                      1829
                      1830
                             usgov, usgovmixed, cagov, cagovmixed, licensedusgovmixed, %
                      1831
                             licensedcagov, licensedcagovmixed, othergov, licensedothergov, %
                             iw3c2w3,iw3c2w3g,cc}{%
                      1832
                           \@printpermissiontrue
                      1833
                           \@printcopyrighttrue
                      1834
                           \@acmownedtrue
                      1835
                           \ifnum\acm@copyrightmode=0\relax % none
                      1836
                            \@printpermissionfalse
                      1837
                             \@printcopyrightfalse
                      1838
                      1839
                             \@acmownedfalse
                      1840
                            \ifnum\acm@copyrightmode=2\relax % acmlicensed
                      1841
                            \@acmownedfalse
                      1842
                      1843
                           \ifnum\acm@copyrightmode=3\relax % rightsretained
                      1844
                            \@acmownedfalse
                      1845
                      1846
                           \ifnum\acm@copyrightmode=4\relax % usgov
                      1847
                            \@printpermissiontrue
                      1848
                            \@printcopyrightfalse
                      1849
                            \@acmownedfalse
                      1850
                      1851
                           \ifnum\acm@copyrightmode=6\relax % cagov
                      1853
                            \@acmownedfalse
```

```
1854
                       \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
                  1855
                        \@acmownedfalse
                  1856
                  1857
                       \ifnum\acm@copyrightmode=9\relax % licensedcagov
                  1858
                        \@acmownedfalse
                  1859
                  1860
                       \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
                        \@acmownedfalse
                  1862
                       \fi
                  1863
                       \ifnum\acm@copyrightmode=11\relax % othergov
                  1864
                        \@acmownedtrue
                  1865
                  1866
                       \ifnum\acm@copyrightmode=12\relax % licensedothergov
                  1867
                        \@acmownedfalse
                  1868
                  1869
                       \ifnum\acm@copyrightmode=13\relax % iw3c2w3
                  1870
                        \@acmownedfalse
                  1871
                  1872
                       \fi
                       \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
                  1873
                        \@acmownedfalse
                  1874
                  1875
                       \ifnum\acm@copyrightmode=15\relax % cc
                  1876
                        \@acmownedfalse
                  1877
                  1878
                       \fi}
   \setcopyright This is the syntactic sugar around setting keys.
                  1879 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
                  1880 \setcopyright{acmlicensed}
      \setcctype The type of Creative Commons license used
                  1881 \newcommand\setcctype[2][4.0]{%
                      \def\ACM@cc@version{#1}%
                  1883 \def\ACM@cc@type{#2}}
                  1884 \setcctype{by}
\@copyrightowner Here is the owner of the copyright
                  1885 \def\@copyrightowner{%
                       \ifcase\acm@copyrightmode\relax % none
                  1886
                       \or % acmcopyright
                  1887
                       ACM\@.
                  1888
                       \or % acmlicensed
                  1889
                       Copyright held by the owner/author(s). Publication rights licensed to
                  1890
                  1891
                       \or % rightsretained
                  1892
                       Copyright held by the owner/author(s).
                  1893
                  1894
                       \or % usgov
                  1895
                      \or % usgovmixed
                      Copyright held by the owner/author(s).
                  1896
                       \or % cagov
                  1897
                  1898 Copyright Crown in Right of Canada.
                       \or %cagovmixed
                  1899
                      Copyright held by the owner/author(s).
                  1900
                      \or %licensedusgovmixed
```

```
Copyright held by the owner/author(s). Publication rights licensed to
                          1902
                               ACM\@.
                          1903
                               \or % licensedcagov
                          1904
                               Copyright held by the owner/author(s).
                          1905
                               \or %licensedcagovmixed
                          1906
                               Copyright held by the owner/author(s). Publication rights licensed to
                               ACM\@.
                               \or % othergov
                          1909
                               Copyright held by the owner/author(s).
                          1910
                               1911
                               Copyright held by the owner/author(s). Publication rights licensed to
                          1912
                               ACM\@.
                          1913
                               \or % ic2w3www
                          1914
                               IW3C2 (International World Wide Web Conference Committee), published
                          1915
                               under Creative Commons CC-BY~4.0 License.
                          1916
                               \or % ic2w3wwwgoogle
                          1917
                               IW3C2 (International World Wide Web Conference Committee), published
                               under Creative Commons CC-BY-NC-ND~4.0 License.
                          1920
                               \or % cc
                               Copyright held by the owner/author(s).
                          1921
                          1922
                               \fi}
             \@formatdoi Print a clickable DOI
                          1923 \def\@formatdoi#1{\url{https://doi.org/#1}}
\@ACM@copyright@check@cc At present cC licenses can be used only for acmengage format or for non-acm stuff. This
                          macro checks whether the CC license is applicable and generates an error if not.
                          1924 \def\@ACM@copyright@check@cc{%
                          1925
                               \if@ACM@nonacm
                                   \ClassInfo{\@classname}{Using CC license with a non-acm
                          1926
                                     material}%
                          1927
                          1928
                               \else
                                   \if@ACM@engage
                          1929
                                      \ClassInfo{\@classname}{Using CC license with ACM Enage
                          1930
                                        material}%
                          1931
                                    \else
                          1932
                                    \ClassWarning{\@classname}{%
                          1933
                                     Sorry, Creative Commons licenses are\MessageBreak
                          1934
                                     currently not used with ACM publications\MessageBreak
                          1935
                                      typeset by the authors}{Please use nonacm
                          1936
                                         option or ACM Engage class to enable CC licenses}%
                          1937
                                    \fi
                          1938
                          1939
                               \fi}
   \@copyrightpermission The canned permission block.
                          1940 \def\@copyrightpermission{%
                               \ifcase\acm@copyrightmode\relax % none
                          1941
                               \or % acmcopyright
                          1942
                                Permission to make digital or hard copies of all or part of this
                          1943
                                work for personal or classroom use is granted without fee provided
                          1944
                                that copies are not made or distributed for profit or commercial
                          1945
                                advantage and that copies bear this notice and the full citation on
                          1946
                                the first page. Copyrights for components of this work owned by
                          1947
```

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```
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      and hspace * {.5pt}/or
1951
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1952
1953
     \or % acmlicensed
      Permission to make digital or hard copies of all or part of this
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      work for personal or classroom use is granted without fee provided
      that copies are not made or distributed for profit or commercial
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      advantage and that copies bear this notice and the full citation on
      the first page. Copyrights for components of this work owned by
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      others than the author(s) must be honored. Abstracting with credit
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      is permitted. To copy otherwise, or republish, to post on servers
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      or to redistribute to lists, requires prior specific permission
1961
      and\hspace*{.5pt}/or a fee. Request permissions from
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      permissions@acm.org.
1963
     \or % rightsretained
1964
      Permission to make digital or hard copies of part or all of this
      work for personal or classroom use is granted without fee provided
      that copies are not made or distributed for profit or commercial
1967
      advantage and that copies bear this notice and the full citation on
1968
      the first page. Copyrights for third-party components of this work
1969
      must be honored. For all other uses, contact the
1970
      owner\hspace*{.5pt}/author(s).
1971
     \or % usgov
1972
1973
      This paper is authored by an employee(s) of the United States
      Government and is in the public domain. Non-exclusive copying or
1974
      redistribution is allowed, provided that the article citation is
1975
      given and the authors and agency are clearly identified as its
1976
      source. All others Request permissions from
1977
1978
      owner\hspace*{.5pt}/author(s).
     \or % usgovmixed
1979
      ACM acknowledges that this contribution was authored or co-authored
1980
      by an employee, contractor, or affiliate of the United States
1981
      government. As such, the United States government retains a
1982
      nonexclusive, royalty-free right to publish or reproduce this
1983
```

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1984 1985

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                               2066
                                       \or % CC
                               2067
                                           \@ACM@copyright@check@cc
                               2068
                                           \IfEq{\ACM@cc@type}{zero}{%
                               2069
                                            \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0/legalcode}}{%
                               2070
                                        \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version/legalcode}}%
                               2071
                                         \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\\
                               2072
                                           \href{\ACM@CC@Url}{%
                               2073
                                           This work is licensed under a Creative Commons
                               2074
                               2075
                                           \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
                               2076
                                               \IfEq{\ACM@cc@type}{by}{Attribution}{}%
                                               \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{}%
                               2077
                                               2078
                                               \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{}%
                               2079
                                               \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{}%
                               2080
                                            \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{}%
                               2081
                               2082
                                                `\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
                               2083
                                           License.}%
                               2084
                               2085 \fi}
 \copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
                               2086 \def\copyrightyear#1{\def\@copyrightyear{#1}}
                               2087 \copyrightyear{\@acmYear}
\@teaserfigures The teaser figures container
                               2088 \def\@teaserfigures{}
     teaserfigure The teaser figure
                               2089 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}
     \@saveteaser Saving the teaser
                               2090 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}
               \thanks We redefine amsart \thanks so the anonymous key works
                               2091 \renewcommand{\thanks}[1]{%
                                         \@ifnotempty{#1}{%
                               2093
                                             \if@ACM@anonymous
                                                 \g@addto@macro\thankses{\thanks{A note}}%
                               2094
                               2095
                                           \else
                                             \gen{array}{ll} \gen{array}{
                               2096
                               2097
                   \anon We provide \anon command, which obscures parts of the text if the package option
```

anonymous is set

```
2098 \newcommand{\anon}[2][ANONYMIZED]{%
2099 \if@ACM@anonymous%
2100 {\color{ACMOrange}#1}%
2101 \else%
2102 #2%
2103 \fi}
```

3.19 Maketitle hook

The current LATEX provides a nice 1thooks mechanism. However, since it is relatively new, we will use oldfashioned approach—at least for now.

\@beginmaketitlehook The hook

```
2104 \ifx\@beginmaketitlehook\@undefined
2105 \let\@beginmaketitlehook\@empty
2106 \fi
```

\AtBeginMaketitle Adding to the hook

2107 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}

3.20 ACM Engage top matter

\@acmengagemetadata The special metadata for ACM engage course materials

2108 \def\@acmengagemetadata{}

\setengagemetadata Adding topic to engage metadata

```
2109 \def\setengagemetadata#1#2{%
2110 \g@addto@macro{\@acmengagemetadata}{%
2111 \@setengagemetadata{#1}{#2}}}
```

3.21 Typesetting top matter

\mktitle@bx Some of our formats use a two-column design. Some use a one-column design. In all cases we use a wide title. Thus we typeset the top matter in a special box to be used in the construction \@twocolumn[$\langle box \rangle$].

2112 \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 thanks. The latter two 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.

```
2113 \def\maketitle{\@beginmaketitlehook
     \@ACM@maketitle@typesettrue
     \if@ACM@anonymous
2115
       % Anonymize omission of \author-s
2116
2117
       \ifnum\num@authorgroups=0\author{}\fi
    \fi
2118
     \begingroup
2119
2120 \let\@vspace\@vspace@orig
     \let\@vspacer\@vspacer@orig
2121
2122 \let\@footnotemark\@footnotemark@nolink
```

```
\let\@footnotetext\@footnotetext@nolink
2123
     \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2124
     \hsize=\textwidth
2125
     \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2126
     \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
2127
     \@printtopmatter
2128
     \if@ACM@sigchiamode\@mkauthors\fi
2129
     \setcounter{footnote}{0}%
2130
     2131
2132
     \@titlenotes
2133
     \@subtitlenotes
     \@authornotes
2134
     \let\@makefnmark\relax
2135
     \let\@thefnmark\relax
2136
     \let\@makefntext\noindent
2137
     \ifx\@empty\thankses\else
2138
       \footnotetextauthorsaddresses{%
2139
         \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2140
2141
     \fi
     \if@ACM@acmcp\else
2142
       \ifx\@empty\@authorsaddresses\else
2143
          \if@ACM@anonymous\else
2144
            \if@ACM@journal@bibstrip
2145
              \footnotetextauthorsaddresses{%
2146
                 \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2147
            \fi
2148
          \fi
2149
       \fi
2150
     \fi
2151
     \if@ACM@nonacm
2152
       \ifnum\acm@copyrightmode=15\relax % cc
2153
          \footnotetextcopyrightpermission{\@copyrightpermission}%
2154
       \fi
2155
     \else
2156
       \if@ACM@acmcp\else
2157
       \footnotetextcopyrightpermission{%
2158
       \if@ACM@authordraft
2159
2160
           \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][1]{\large\bfseries
2161
               Unpublished working draft. Not for distribution.}}%
2162
          \color[gray]{0.9}%
       \fi
2163
       \parindent\z@\parskip0.1\baselineskip
2164
2165
       \if@ACM@authorversion\else
         \if@printpermission\@copyrightpermission\par\fi
2166
       \fi
2167
       \if@ACM@manuscript\else
2168
          \if@ACM@journal@bibstrip\else % Print the conference information
2169
2170
            \if@ACM@engage
               {\itshape \@acmBooktitle, \@acmYear.}\par
2171
2172
2173
         {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
2174
            \fi
          \fi
2175
       \fi
```

```
\if@printcopyright
2177
          \copyright\ \@copyrightyear\ \@copyrightowner\\
2178
        \else
2179
          \@copyrightyear.\
2180
2181
       \if@ACM@manuscript
2182
          Manuscript submitted to ACM\\
2183
2184
        \else
          \if@ACM@authorversion
2185
              This is the author's version of the work. It is posted here for
2186
              your personal use. Not for redistribution. The definitive Version
2187
              of Record was published in
2188
              \if@ACM@journal@bibstrip
2189
                \emph{\@journalName}%
2190
              \else
2191
                \emph{\@acmBooktitle}%
2192
              \fi
2193
              \ifx\@acmDOI\@empty
2195
2196
              \else
                 , \@formatdoi{\@acmDOI}.
2197
              \fi\\
2198
            \else
2199
              \if@ACM@nonacm\else
2200
                \if@ACM@journal@bibstrip
2201
                  ACM^{\operatorname{QpermissionCodeOne/QacmYear/QacmMonth-ART}} \\
2202
                   \@formatdoi{\@acmDOI}%
2203
                \else % Conference
2204
                   \ \ \ ACM^ISBN^Qempty\else\ ACM^ISBN^QemISBN\fi
2205
                   \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2206
                \fi
2207
              \fi
2208
            \fi
2209
          \fi}%
2210
        \fi
2211
2212
     \endgroup
2213
2214
      \if@ACM@engage\@typesetengagemetadata\fi
      \setcounter{footnote}{0}%
2216
     \@mkabstract
     \ifx\@translatedabstracts\@empty\else
2217
2218
     \@translatedabstracts\fi
     \if@ACM@printccs
2219
     \ifx\@concepts\@empty\else\bgroup
2220
          {\@specialsection{CCS Concepts}%
2221
             \noindent\@concepts\par}\egroup
2222
         \fi
2223
      \fi
2224
       \if@ACM@acmcp\else
2225
2226
         \ifx\@keywords\@empty\else\bgroup
2227
            {\@specialsection{\keywordsname}%
2228
               \noindent\@keywords\par}\egroup
         \fi
2229
       \ifx\@translatedkeywords\@empty\else
2230
```

```
\@translatedkeywords
                                                           \fi
                                          2232
                                                      \fi
                                          2233
                                                      \let\metadata@authors=\authors
                                          2234
                                                      \mbox{\nxandlist{, }{, }{, }\mbox{\mbox{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\nxandlist{\n
                                          2235
                                                      \def\@ACM@checkaffil{}%
                                          2236
                                                      \hypersetup{%
                                          2237
                                                           pdfauthor={\metadata@authors},
                                          2238
                                          2239
                                                           pdftitle={\@title},
                                                           pdfsubject={\@concepts},
                                          2240
                                                           pdfkeywords={\@keywords},
                                          2241
                                                           pdfcreator={LaTeX with acmart
                                          2242
                                                                \csname ver@acmart.cls\endcsname\space
                                          2243
                                          2244
                                                                and hyperref
                                                                \csname ver@hyperref.sty\endcsname}}%
                                          2245
                                                       \andify\authors
                                          2246
                                                       \andify\shortauthors
                                          2247
                                                       \global\let\authors=\authors
                                          2249
                                                       \global\let\shortauthors=\shortauthors
                                          2250
                                                       \if@ACM@printacmref
                                          2251
                                                              \@mkbibcitation
                                                      \fi
                                          2252
                                                       \global\@topnum\z@ % this prevents floats from falling
                                          2253
                                                                                                   % at the top of page 1
                                          2254
                                                      \global\@botnum\z@ % we do not want them to be on the bottom either
                                          2255
                                          2256
                                                      \@printendtopmatter
                                                      \@afterindentfalse
                                          2257
                                                      \@afterheading
                                          2258
                                                      \if@ACM@acmcp
                                          2259
                                          2260
                                                           \set@ACM@acmcpbox
                                                           \AtEndDocument{\end@ACM@color@frame}%
                                          2261
                                          2262
                                                           \@ACM@color@frame
                                                     \fi
                                          2263
                                          2264 }
\set@ACM@acmcpbox Setting infobox for acmcp
                                          2265 \newbox\@ACM@acmcpbox
                                          2266 \def\set@ACM@acmcpbox{%
                                                     \bgroup
                                          2267
                                                      \hsize=5pc
                                          2268
                                                       \global\setbox\@ACM@acmcpbox=\vbox{%
                                          2269
                                                           \setlength{\parindent}{\z@}%
                                          2270
                                                           {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
                                          2271
                                          2272
                                                           \scriptsize
                                                           \ifnum\getrefnumber{TotPages}>1\else
                                          2273
                                                                \zrefused{@ACM@acmcpbox@y}%
                                          2275
                                                                \zrefused{@ACM@acmcpframe@y}%
                                          2276
                                                                \@tempdima=\dimexpr\zposy{@ACM@acmcpbox@y}sp -
                                          2277
                                                                \zposy{@ACM@acmcpframe@y}sp+0.3\FrameSep+
                                                                \@ACM@acmcp@delta\relax
                                          2278
                                                                \ifdim\@tempdima>0pt\relax
                                          2279
                                                                       \vspace*{\@tempdima}%
                                          2280
                                                                       \protected@write\@auxout{}%
                                          2281
                                                                       2282
```

```
\fi
                  2284
                          \ifx\@acmCodeDataLink\@empty\else\bigskip
                  2285
                          Code and data links:\\ \@acmCodeDataLink\par\bigskip
                  2286
                  2287
                          \ifx\@keywords\@empty\else\bigskip
                  2288
                            Keywords: \@keywords\par
                  2289
                          \fi
                  2290
                          \ifx\@acmContributions\@empty\else\bigskip
                  2291
                            \@acmContributions\par
                  2292
                  2293
                          \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
                  2294
                          \zsaveposy{@ACM@acmcpbox@y}%
                  2295
                  2296
                       }
                  2297 \egroup}
\@specialsection This macro starts sections for proceedings and uses \small for journals
                  2298 \def\@specialsection#1{%
                        \let\@vspace\@vspace@orig
                  2299
                        \let\@vspacer\@vspacer@orig
                  2300
                  2301
                        \ifcase\ACM@format@nr
                        \relax % manuscript
                  2303
                          \par\medskip\small\noindent#1: %
                  2304
                        \or % acmsmall
                  2305
                          \par\medskip\small\noindent#1: %
                        \or % acmlarge
                  2306
                          \par\medskip\small\noindent#1: %
                  2307
                  2308
                        \or % acmtog
                          \par\medskip\small\noindent#1: %
                  2309
                        \or % sigconf
                  2310
                  2311
                          \section*{#1}%
                  2312
                        \or % siggraph
                  2313
                          \section*{#1}%
                  2314
                        \or % sigplan
                           \noindentparagraph*{#1:~}%
                  2315
                        \or % sigchi
                  2316
                          \section*{#1}%
                  2317
                        \or % sigchi-a
                  2318
                          \section*{#1}%
                  2319
                        \or % acmengage
                  2320
                  2321
                          \section*{#1}%
                  2322
                        \or % acmcp
                          \section*{#1}%
                  2324
                        \let\@vspace\@vspace@acm
                  2325
                        \let\@vspacer\@vspacer@acm
                  2326
                  2327 }
```

\@printtopmatter The printing of top matter starts a new page and uses the given title box.

Note that if there are too many authors, \mktitle@bx might overflow the page. Therefore we start with checking this and if this happens, we split the box and print it page by page.

```
2328 \def\@printtopmatter{%
2329 \ifx\@startPage\@empty
```

\fi

```
\else
          2331
                    \setcounter{page}{\@startPage}%
          2332
          2333
                \@tempdima=\ht\mktitle@bx
          2334
                \advance\@tempdima by \dp\mktitle@bx
          2335
                \ifdim\@tempdima>0.9\textheight
          2336
          2337
                  \loop
                     \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
          2338
                     \thispagestyle{firstpagestyle}%
          2339
                     \noindent\unvbox\@tempboxa
          2340
                     \clearpage
          2341
                     \@tempdima=\ht\mktitle@bx
          2342
                     \advance\@tempdima by \dp\mktitle@bx
          2343
                  \ifdim\@tempdima>0.9\textheight\repeat
          2344
          2345
                \thispagestyle{firstpagestyle}%
          2346
                \noindent
                \ifcase\ACM@format@nr
          2348
                \relax % manuscript
          2349
                  \box\mktitle@bx\par
          2350
                \or % acmsmall
          2351
                  \box\mktitle@bx\par
          2352
                \or % acmlarge
          2353
          2354
                  \box\mktitle@bx\par
          2355
                \or % acmtog
                  \twocolumn[\box\mktitle@bx]%
          2356
                \or % sigconf
          2357
                  \twocolumn[\box\mktitle@bx]%
          2358
          2359
                \or % siggraph
                  \twocolumn[\box\mktitle@bx]%
          2360
                \or % sigplan
          2361
                  \verb|\twocolumn[\box\mktitle@bx]||
          2362
                \or % sigchi
          2363
                  \twocolumn[\box\mktitle@bx]%
          2364
                \or % sigchi-a
          2365
                  \par\box\mktitle@bx\par\bigskip
          2366
          2367
                \or % acmengage
                  \twocolumn[\box\mktitle@bx]%
          2369
                \or % acmcp
                    \box\mktitle@bx\par
          2370
          2371
                \fi
          2372 }
\@mktitle The title of the article
          2373 \def\@mktitle{%
                \ifcase\ACM@format@nr
          2374
                \relax % manuscript
          2375
                  \@mktitle@i
          2376
                \or % acmsmall
          2377
                  \@mktitle@i
          2378
                \or % acmlarge
          2379
                  \@mktitle@i
          2380
               \or % acmtog
          2381
```

\gdef\@startPage{1}%

```
\@mktitle@i
                2382
                      \or % sigconf
                2383
                        \@mktitle@iii
                2384
                      \or % siggraph
                2385
                        \@mktitle@iii
                2386
                2387
                      \or % sigplan
                2388
                        \@mktitle@iii
                2389
                      \or % sigchi
                2390
                        \@mktitle@iii
                      \or % sigchi-a
                2391
                        \@mktitle@iv
                2392
                      \or % acmengage
                2393
                        \@mktitle@iii
                2394
                      \or % acmcp
                2395
                        \@mktitle@i
                2396
                2397
                2398 }
   \@titlefont The font to typeset the title
                2399 \def\@titlefont{%
                2400
                      \ifcase\ACM@format@nr
                2401
                      \relax % manuscript
                        \LARGE\sffamily\bfseries
                2402
                2403
                      \or % acmsmall
                        \LARGE\sffamily\bfseries
                2405
                      \or % acmlarge
                        \LARGE\sffamily\bfseries
                2406
                      \or % acmtog
                2407
                        \Huge\sffamily
                2408
                      \or % sigconf
                2409
                        \Huge\sffamily\bfseries
                2410
                      \or % siggraph
                2411
                        \Huge\sffamily\bfseries
                2412
                      \or % sigplan
                2413
                2414
                        \Huge\bfseries
                      \or % sigchi
                        \Huge\sffamily\bfseries
                2416
                      \or % sigchi-a
                2417
                         \Huge\bfseries
                2418
                      \or % acmengage
                2419
                        \Huge\sffamily\bfseries
                2420
                2421
                      \or % acmcp
                        \LARGE\sffamily\bfseries
                2422
                     \fi}
                2423
\@subtitlefont The font to typeset the subtitle
                2424 \def\@subtitlefont{\normalsize
                     \ifcase\ACM@format@nr
                2425
                2426
                      \relax % manuscript
                        \mdseries
                2427
                     \or % acmsmall
                2428
                        \mdseries
                     \or % acmlarge
                2431
                       \mdseries
```

```
\or % acmtog
              2432
                      \LARGE
              2433
                   \or % sigconf
              2434
                      \LARGE\mdseries
              2435
                   \or % siggraph
              2436
                      \LARGE\mdseries
              2437
                   \or % sigplan
              2438
                      \LARGE\mdseries
              2439
              2440
                   \or % sigchi
                      \LARGE\mdseries
              2441
              2442
                   \or % sigchi-a
              2443
                      \mdseries
                   \or % acmengage
              2444
                      \LARGE\mdseries
              2445
                    \or % acmcp
              2446
                     \mdseries
              2447
                   \fi}
  \@mktitle@i The version of \mktitle for most journals
              2449 \def\@mktitle@i{\hsize=\textwidth
              2450
                   \if@ACM@acmcp
              2451
                     \advance\hsize by -6pc%
              2452
                   \@ACM@title@width=\hsize
              2454
                   \setbox\mktitle@bx=\vbox{\noindent\@titlefont
              2455
                     \parbox[t]{\@ACM@title@width}{\raggedright
              2456
                        \@titlefont\noindent
                        \@title\@translatedtitle%
              2457
                   \ifx\@subtitle\@empty\else
              2458
                     \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
              2459
                   \fi}%
              2460
                   \par\bigskip}}%
              2461
 \@mktitle@ii The version of \mktitle for TOG. Since v1.06, this is subsumed by the \mktitle@i
\@mktitle@iii The version of \@mktitle for SIG proceedings.
              2462 \def\@mktitle@iii{\hsize=\textwidth
                     \setbox\mktitle@bx=\vbox{\@titlefont\centering
              2463
                        \@ACM@title@width=\hsize
              2464
                        \parbox[t]{\@ACM@title@width}{\centering\@titlefont
              2465
              2466
                          \@title\@translatedtitle%
              2467
                          \ifx\@subtitle\@empty\else
                            \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
              2468
                          \fi
              2469
              2470
                        }%
              2471
                        \par\bigskip}}%
 \@mktitle@iv The version of \@mktitle for sigchi-a
              2472 \def\@mktitle@iv{\hsize=\textwidth
                     2473
                        \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
              2474
                        \noindent\@title\@translatedtitle%
              2475
              2476
                      \ifx\@subtitle\@empty\else
```

```
2477 \par\noindent\@subtitlefont\@subtitle\@translatedsubtitle%
2478 \fi
2479 \par\bigskip}}%
```

\@ACM@addtoaddress This macro adds an item to the 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 at the end of a line. We use the magic \cleaders trick for this.

```
2480 \newbox\@ACM@commabox
                                              2481 \def\@ACM@addtoaddress#1{%
                                                              \ifvmode\else
                                              2482
                                                                    \if@ACM@affiliation@obeypunctuation\else
                                              2483
                                                                    \setbox\@ACM@commabox=\hbox{, }%
                                                                    \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
                                                              \fi\fi
                                              2486
                                              2487
                                                             #1}
     \institution Theoretically we can define the macros for \affiliation inside the \@mkauthors-style
               \position commands. However, this would lead to a strange error if an author uses them outside
        \department \affiliation. Of course we can make them produce an error message, but...
\streetaddress 2488 \def\streetaddress#1{\unskip\ignorespaces}
                           \city 2489 \def\postcode#1{\unskip\ignorespaces}
                        \state 2490 \if@ACM@journal
                                                              \def\position#1{\unskip\ignorespaces}
               \postcode 2491
                                                              \def\institution#1{\global\@ACM@instpresenttrue
                 \country ^{2492}
                                                                    \unskip~#1\ignorespaces}
                                                               \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
                                                              \def\state#1{\unskip\ignorespaces}
                                              2495
                                                              \newcommand\department[2][0]{\unskip\ignorespaces}
                                              2496
                                                              \def\country#1{\StrDel{#1}{ }[\ensuremanh{\country}#1%]} \def\country#1{\StrDel{#1}{ }[\ensuremanh{\country}#1%]} \def\country#1% \def\count
                                              2497
                                                                    \int \mathbb{C}^{0}
                                              2498
                                                                    \global\@ACM@countrypresenttrue\fi
                                              2499
                                                                    \if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
                                              2500
                                              2501 \else
                                                              2502
                                                              \def\institution#1{\global\@ACM@instpresenttrue
                                              2503
                                                                    \if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
                                              2504
                                                              2505
                                                                    #2\else#2\par\fi}%
                                              2506
                                              2507\% \def\streetaddress#1{if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
                                              2508 \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
                                              2509 \let\state\@ACM@addtoaddress
                                              2510 \% \def\postcode#1{\i.e.} ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}% Acmounts and the control of the con
                                              2512 \fi
        \@mkauthors Typesetting the authors
                                              2513 \def\@mkauthors{\begingroup
                                              2514 \hsize=\textwidth
                                              2515 \ifcase\ACM@format@nr
```

```
\@mkauthors@i
                  2517
                       \or % acmsmall
                  2518
                         \@mkauthors@i
                  2519
                       \or % acmlarge
                  2520
                         \@mkauthors@i
                  2521
                       \or % acmtog
                  2522
                  2523
                         \@mkauthors@i
                  2524
                       \or % sigconf
                         \@mkauthors@iii
                  2525
                  2526
                       \or % siggraph
                         \@mkauthors@iii
                  2527
                       \or % sigplan
                  2528
                         \@mkauthors@iii
                  2529
                        \or % sigchi
                  2530
                         \@mkauthors@iii
                  2531
                        \or % sigchi-a
                  2532
                         \@mkauthors@iv
                  2534
                        \or % acmengage
                  2535
                         \@mkauthors@iii
                  2536
                        \or % acmcp
                         \@mkauthors@i
                  2537
                       \fi
                  2538
                       \endgroup
                  2539
                  2540 }
    \@authorfont Somehow different conferences use different fonts for author names. Why?
                  2541 \def\@authorfont{\Large\sffamily}
\@affiliationfont Font for affiliations
                  Adjusting fonts for different formats
                  2543 \ifcase\ACM@format@nr
                  2544 \relax % manuscript
                  2545 \or % acmsmall
                       \def\@authorfont{\large\sffamily}
                       \def\@affiliationfont{\small\normalfont}
                  2548 \or % acmlarge
                  2549 \or % acmtog
                  2550 \def\@authorfont{\LARGE\sffamily}
                  2551 \def\@affiliationfont{\large}
                  2552 \or % sigconf
                       \def\@authorfont{\LARGE}
                  2553
                  2554 \def\@affiliationfont{\large}
                  2555 \or % siggraph
                  2556 \def\@authorfont{\normalsize\normalfont}
                  2557 \def\@affiliationfont{\normalsize\normalfont}
                  2558 \or % sigplan
                  2559 \def\@authorfont{\Large\normalfont}
                      \def\@affiliationfont{\normalsize\normalfont}
                  2560
                  2561 \or % sigchi
                  2562 \def\@authorfont{\bfseries}
                      \def\@affiliationfont{\mdseries}
```

\relax % manuscript

```
2564 \or % sigchi-a
                             \def\@authorfont{\bfseries}
                        2565
                             \def\@affiliationfont{\mdseries}
                        2566
                        2567 \or % acmengage
                             \def\@authorfont{\LARGE}
                        2568
                            \def\@affiliationfont{\large}
                        2570 \or % acmcp
                             \def\@authorfont{\large\sffamily}
                             \def\@affiliationfont{\small\normalfont}
                        2572
                        2573 \fi
 \@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset
                        them in the journal style
                        2574 \def\@typeset@author@line{%
                        2575
                             \andify\@currentauthors\par\noindent
                        2576
                             \@currentauthors\def\@currentauthors{}%
                             \ifx\@currentaffiliations\@empty\else
                        2577
                                \andify\@currentaffiliations
                        2578
                                  \unskip, {\@currentaffiliations}\par
                        2579
                        2580
                             \fi
                             \def\@currentaffiliations{}}
   \if@ACM@instpresent Whether the given affiliation has institution
                        2582 \newif\if@ACM@instpresent
                        2583 \@ACM@instpresenttrue
   \if@ACM@citypresent Whether the given affiliation has city
                        2584 \newif\if@ACM@citypresent
                        2585 \@ACM@citypresenttrue
\if@ACM@countrypresent Whether the given affiliation has country
                        2586 \newif\if@ACM@countrypresent
                        2587 \@ACM@countrypresenttrue
      \@ACM@resetaffil Reset affiliation flags
                        2588 \def\@ACM@resetaffil{%
                             \global\@ACM@instpresentfalse
                             \global\@ACM@citypresentfalse
                             \global\@ACM@countrypresentfalse
                        2591
                        2592 }
      \@ACM@checkaffil Check affiliation flags
                        2593 \def\@ACM@checkaffil{%
                             \if@ACM@instpresent\else
                             \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
                        2595
                        2596
                             \if@ACM@citypresent\else
                        2597
                             \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
                        2598
                        2599
                             \if@ACM@countrypresent\else
                        2600
                             \ClassError{\@classname}{No country present for an affiliation}{ACM
                        2601
                               requires each author to indicate their country using country macro.}%
                        2602
                        2603
                        2604 }
```

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

```
2605 \def\@mkauthors@i{%
                                                   \def\@currentauthors{}%
                                      2606
                                                   \def\@currentaffiliations{}%
                                      2607
                                                    \verb|\global\let\and\@typeset@author@line||
                                      2608
                                                    \def\@author##1{%
                                      2609
                                                        \ifx\@currentauthors\@empty
                                      2610
                                                              \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
                                      2611
                                      2612
                                      2613
                                                                 \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
                                      2614
                                                        \fi
                                      2615
                                                         \def\email##1##2{}%
                                      2616
                                                    \def\affiliation##1##2{%
                                      2617
                                                         2618
                                                                 \ifx\@currentaffiliations\@empty
                                      2619
                                                                        \gdef\@currentaffiliations{%
                                      2620
                                                                              \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                      2621
                                                                              \setkeys{@ACM@affiliation@}{##1}%
                                      2622
                                                                              \@ACM@resetaffil
                                      2623
                                                                              \@affiliationfont##2\@ACM@checkaffil}%
                                      2624
                                      2625
                                                                 \else
                                      2626
                                                                      \g@add to @macro {\current affiliations} {\current affiliations} \label{thm:continuous} \
                                      2627
                                                                           \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                                                           \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                                      2628
                                                                           ##2\@ACM@checkaffil}%
                                      2629
                                                              \fi
                                      2630
                                      2631
                                                            \global\let\and\@typeset@author@line}%
                                      2632
                                                    \if@ACM@acmcp
                                      2633
                                                         \advance\hsize by -6pc%
                                      2634
                                      2635
                                                    \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
                                      2636
                                                        \noindent\addresses\@typeset@author@line
                                      2637
                                                       \par\medskip}%
                                      2638
                                      2639 }
\@mkauthors@ii The \@mkauthors@ii command was the version used in acmtog. It is no longer neces-
         \author@bx The box to put an individual author in
                                      2640 \newbox\author@bx
  \author@bx@wd The width of the author box
                                      2641 \newdimen\author@bx@wd
```

\@typeset@author@bx Typesetting the box with authors. Note that in sigchi-a the box is not centered. 2644 \def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd

\author@bx@sep The separation between author boxes

2642 \newskip\author@bx@sep

2643 \author@bx@sep=1pc\relax

```
2645 \def\and{\par}\normalbaselines
2646 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2647 \@authorfont\@currentauthors\par\@affiliationfont
2648 \@currentaffiliation}\egroup
2649 \box\author@bx\hspace{\author@bx@sep}%
2650 \gdef\@currentauthors{}%
2651 \gdef\@currentaffiliation{}}
```

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

2652 \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 ($\author@bx@sep$)/N - $\author@bx@sep$, where N is the number of boxes per row.

```
\author@bx@wd=\textwidth\relax
2653
     \advance\author@bx@wd by -\author@bx@sep\relax
2654
     \ifnum\@ACM@authorsperrow>0\relax
2655
       \divide\author@bx@wd by \@ACM@authorsperrow\relax
2656
     \else
2657
       \ifcase\num@authorgroups
2658
2659
       \relax % 0?
       \or % 1=one author per row
2660
       \or % 2=two authors per row
          \divide\author@bx@wd by \num@authorgroups\relax
2662
       \or % 3=three authors per row
2663
          2664
       \or % 4=two authors per row (!)
2665
          \divide\author@bx@wd by 2\relax
2666
       \else % three authors per row
2667
          \divide\author@bx@wd by 3\relax
2668
       \fi
2669
2670
     \fi
     \advance\author@bx@wd by -\author@bx@sep\relax
Now, parsing of \addresses:
     \gdef\@currentauthors{}%
     \gdef\@currentaffiliation{}%
     \def\@author##1{\ifx\@currentauthors\@empty
2674
       \gdef\@currentauthors{\par##1}%
2675
     \else
2676
       \g@addto@macro\@currentauthors{\par##1}%
2677
2678
     \gdef\and{}}%
2679
     \def\email##1##2{\ifx\@currentaffiliation\@empty
2680
       \gdef\@currentaffiliation{\bgroup
2681
         \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2682
2683
       \g@addto@macro\@currentaffiliation{\par\bgroup
2684
         \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2685
     \fi}%
2686
     \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2687
       \gdef\@currentaffiliation{%
2688
         \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2689
         \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2690
```

```
##2\@ACM@checkaffil}%
2691
     \else
2692
        \g@addto@macro\@currentaffiliation{\par
2693
          \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2694
          \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2695
          ##2\@ACM@checkaffil}%
2696
     \fi
2697
     \global\let\and\@typeset@author@bx
2698
2699 }%
Actual typesetting is done by the \and macro:
     \hsize=\textwidth
     \global\setbox\mktitle@bx=\vbox{\noindent
2701
       \unvbox\mktitle@bx\par\medskip\leavevmode
2702
2703
       \lineskip=1pc\relax\centering\hspace*{-1em}%
       \addresses\let\and\@typeset@author@bx\and\par\bigskip}}
2704
```

\@mkauthors@iv The sigchi-a version. We put authors in the main text with no more than 2 authors per line, unless overriden.

```
2705 \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 ($\author@bx@sep$)/N - $\author@bx@sep$, where N is the number of boxes per row.

```
\author@bx@wd=\columnwidth\relax
2706
     \advance\author@bx@wd by -\author@bx@sep\relax
2707
     \ifnum\@ACM@authorsperrow>0\relax
2708
       \divide\author@bx@wd by \@ACM@authorsperrow\relax
2709
     \else
2710
       \ifcase\num@authorgroups
2712
       \relax % 0?
       \or % 1=one author per row
2713
       \else % 2=two authors per row
2714
          \divide\author@bx@wd by 2\relax
2715
       \fi
2716
     \fi
2717
     \advance\author@bx@wd by -\author@bx@sep\relax
2718
Now, parsing of \addresses:
     \gdef\@currentauthors{}%
2719
     \gdef\@currentaffiliation{}%
2720
     \def\@author##1{\ifx\@currentauthors\@empty
2721
       \gdef\@currentauthors{\par##1}%
2722
     \else
2723
       \g@addto@macro\@currentauthors{\par##1}%
2724
     \fi
2725
     2726
     \def\email##1##2{\ifx\@currentaffiliation\@empty
2727
2728
       \gdef\@currentaffiliation{\nolinkurl{##2}}%
     \else
2729
       \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2730
     \fi}%
2731
     \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2732
       \gdef\@currentaffiliation{%
2733
```

```
\setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                           2734
                                                              \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                                           2735
                                                              ##2\@ACM@checkaffil}%
                                           2736
                                                      \else
                                           2737
                                                          \g@addto@macro\@currentaffiliation{\par
                                           2738
                                                              \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                           2739
                                                              \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                                           2740
                                                              ##2\@ACM@checkaffil}%
                                           2741
                                                     \fi
                                           2742
                                                      \global\let\and\etypeset@author@bx}%
                                           2743
                                           2744 %
                                           Actual typesetting is done by the \and macro
                                                          \bgroup\hsize=\columnwidth
                                           2745
                                                          \par\raggedright\leftskip=\z@
                                           2746
                                                          \lineskip=1pc\noindent
                                           2747
                                                         \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}
                                           2748
\@mkauthorsaddresses Typesetting authors' addresses in the footnote style
                                           2749 \def\@mkauthorsaddresses{%
                                                     \ifnum\num@authors>1\relax
                                                    Authors' \else Author's \fi
                                           2752
                                                     \ifnum\num@authorgroups>1\relax
                                           2753
                                                     addresses: \else address: \fi
                                           2754
                                                     \bgroup
                                                     \def\streetaddress##1{\unskip, ##1}%
                                           2755
                                                      \def\postcode##1{\unskip, ##1}%
                                           2756
                                                      \def\position##1{\unskip\ignorespaces}%
                                           2757
                                                     \gdef\@ACM@institution@separator{, }%
                                           2758
                                                    \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }
                                           2759
                                                     \def\city##1{\unskip, ##1}%
                                                      \def\state##1{\unskip, ##1}%
                                                      \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
                                           2762
                                           2763
                                                      \def\country##1{\unskip, ##1}%
                                                      \def\and{\unskip; \gdef\@ACM@institution@separator{, }}%
                                           2764
                                                     \def\@author##1{##1}%
                                           2765
                                                     \def\email##1##2{\unskip, \nolinkurl{##2}}%
                                           2766
                                                      \addresses
                                           2767
                                                     \egroup}
                                           2768
                                           2769 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
                                                    \ifx\@authorsaddresses\@empty
                                           2771
                                                     \ClassWarningNoLine{\@classname}{Authors'
                                                         addresses are mandatory for ACM journals}%
                                          2772
                                                     \fi\fi\fi\
                                           2773
            \@setaddresses This is an amsart macro that we do not need.
                                           2774 \def\@setaddresses{}
       \@authornotemark Adding a footnote mark to authors. This version adds a "normal" footnote mark.
                                           2775 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}
      \@@authornotemark Adding a footnote mark to authors with a given number
                                           2776 \end{fige} add to @macro \end{fige} add
```

```
\@mkteasers Typesetting the teasers
                                                2777 \def\@mkteasers{%
                                                           \ifx\@teaserfigures\@empty\else
                                                2778
                                                2779
                                                               \def\@teaser##1{\par\bigskip\bgroup
                                                2780
                                                                    \captionsetup{type=figure}##1\egroup\par}
                                                2781
                                                               \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
                                                2782
                                                                    \noindent\@Description@presentfalse
                                                2783
                                                                    \@teaserfigures\par\if@Description@present\else
                                                2784
                                                                          \global\@undescribed@imagestrue
                                                                          \verb|\ClassWarning{\@classname}| A possible image without| \\
                                                2785
                                                                              description}\fi
                                                2786
                                                               \medskip}%
                                                2787
                                                          \fi}
                                                2788
                    \@mkabstract Typesetting the abstract
                                                2789 \def\@mkabstract{\bgroup
                                                           \ifx\@abstract\@lempty\else
                                                           {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
                                                2792
                                                               \if@ACM@iournal
                                                                      \everypar{\setbox\z@\lastbox\everypar{}}\small
                                                2793
                                                2794
                                                               \else
                                                2795
                                                                    \section*{\abstractname}%
                                                2796
                                                             \ignorespaces\@abstract\par}%
                                                2797
                                                          \fi\egroup}
                                                2798
\@mktranslatedabstract Typesetting a translated abstract
                                                2799 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
                                                               \if@ACM@journal
                                                2800
                                                2801
                                                                      \everypar{\setbox\z@\lastbox\everypar{}}\small
                                                2802
                                                               \else
                                                2803
                                                                      \section*{\abstractname}%
                                                               \fi
                                                2804
                                                2805
                                                             \ignorespaces}
              \@mkbibcitation Print the bibcitation format
                                                2806 \def\@mkbibcitation{\bgroup
                                                2807
                                                          \let\@vspace\@vspace@orig
                                                          \let\@vspacer\@vspacer@orig
                                                2808
                                                         \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
                                                2809
                                                           \def\footnotemark{}%
                                                2810
                                                           \def\\{\unskip{} \ignorespaces}%
                                                2811
                                                           \def\footnote{\ClassError{\@classname}{Please do not use footnotes
                                                2812
                                                                    inside a \string\title{} or \string\author{} command! Use
                                                2813
                                                                    \string\titlenote{} or \string\authornote{} instead!}}%
                                                2814
                                                           \def\@article@string{\ifx\@acmArticle\@empty{\ }\else,
                                                2815
                                                               Article \@acmArticle \ \fi}%
                                                2816
                                                           \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
                                                2817
                                                2818
                                                           \noindent\bgroup
                                                               \def \ 
                                                2819
                                                          \ifx\@subtitle\@empty. \else: \@subtitle. \fi
                                                2820
                                                          \if@ACM@nonacm\else
                                                2821
                                                               % The 'nonacm' option disables 'printacmref' by default,
                                                2822
                                                               % and the present \@mkbibcitation definition is never used
                                                2823
```

```
% in this case. The conditional remains useful if the user
                        2824
                                % explicitly sets \settopmatter{printacmref=true}.
                        2825
                                \if@ACM@journal@bibstrip
                        2826
                                   \textit{\@journalNameShort}
                        2827
                                   \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
                        2828
                                   \ref{TotPages}~\@pages@word.
                        2829
                        2830
                                   In \textit{\@acmBooktitle}%
                        2831
                                   \ifx\@acmEditors\@empty\textit{.}\else
                        2832
                                     2833
                                   \fi\
                        2834
                                   ACM, New York, NY, USA%
                        2835
                                     \@article@string\unskip, \ref{TotPages}~\@pages@word.
                        2836
                                \fi
                        2837
                              \fi
                        2838
                              \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
                        2840 \par\egroup}
    \@printendtopmatter End the top matter
                        2841 \def\@printendtopmatter{%
                              \let\@vspace\@vspace@orig
                        2842
                              \let\@vspacer\@vspacer@orig
                        2843
                              \par\bigskip
                        2844
                              \let\@vspace\@vspace@acm
                              \let\@vspacer\@vspacer@acm
                        2846
                        2847
                              }
            \@setthanks We redefine \setthanks using \long
                         2848 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
  \@setauthorsaddresses
                        {\tt 2849 \setminus def \setminus @setauthorsaddresses \setminus @authorsaddresses \setminus unskip \setminus @addpunct.}}
\@typesetengagemetadata Typesetting special metadata for ACM Engage
                        2850 \def\@typesetengagemetadata{%
                              \def\@setengagemetadata##1##2{\par\noindent\textbf{##1} ##2\par}%
                              \@acmengagemetadata}
                        3.22 Headers and Footers
                        We use fancyhdr for our headers and footers:
                        2853 \RequirePackage{fancyhdr}
 \ACM@restore@pagestyle The following code by Ross Moore protects against changes by the totpages package:
                        2854 \let\ACM@ps@plain\ps@plain
                        2855 \let\ACM@ps@myheadings\ps@myheadings
                        2856 \let\ACM@ps@headings\ps@headings
                        2857 \def\ACM@restore@pagestyle{%
                              \let\ps@plain\ACM@ps@plain
                        2858
                              \let\ps@myheadings\ACM@ps@myheadings
                              \let\ps@headings\ACM@ps@headings}
                         2861 \AtBeginDocument{\ACM@restore@pagestyle}
```

```
\ACM@linecount@bx This is the box displayed in review mode
                  2862 \if@ACM@review
                        \newsavebox{\ACM@linecount@bx}
                  2863
                  2864
                        \newlength\ACM@linecount@bxht
                        \newcount\ACM@linecount
                  2865
                  2866
                        \ACM@linecount\@ne\relax
                  2867
                        \def\ACM@mk@linecount{%
                          2868
                  2869
                              \normalsize
                              \setlength{\ACM@linecount@bxht}{0pt}%
                  2870
                              \label{loop{color{red}\scriptsize} \label{loop{color{red}\scriptsize}} \\
                  2871
                              \global\advance\ACM@linecount by \@ne
                  2872
                              \addtolength{\ACM@linecount@bxht}{\baselineskip}%
                  2873
                  2874
                              \ifdim\ACM@linecount@bxht<\textheight\repeat
                              {\color{red}\scriptsize\the\ACM@linecount}\hfill
                  2875
                  2876
                              \global\advance\ACM@linecount by \@ne}}}
                  2877 \fi
 \ACM@linecountL How to display the box on the left
                  2878 \def\ACM@linecountL{%
                       \if@ACM@review
                  2880
                        \ACM@mk@linecount
                  2881
                       \begin{picture}(0,0)%
                  2882
                          \t(-26, -22){\t(ACM@linecount@bx)}%
                  2883
                        \end{picture}%
                       \fi}
 \ACM@linecountR How to display the box on the right. In one column formats we do not step the numbers.
                  2885 \def\ACM@linecountR{%
                        \if@ACM@review
                  2886
                          \ifcase\ACM@format@nr
                  2887
                          \relax % manuscript
                  2888
                               \relax
                  2889
                             \or % acmsmall
                  2890
                               \relax
                  2891
                             \or % acmlarge
                  2893
                               \relax
                  2894
                             \or % acmtog
                                \ACM@mk@linecount
                  2895
                             \or % sigconf
                  2896
                                \ACM@mk@linecount
                  2897
                             \or % siggraph
                  2898
                                \ACM@mk@linecount
                  2899
                             \or % sigplan
                  2900
                                \ACM@mk@linecount
                  2901
                             \or % sigchi
                  2902
                  2903
                                \ACM@mk@linecount
                  2904
                             \or % sigchi-a
```

2905

2906

2907

2908

2909

2910

\ACM@mk@linecount

\ACM@mk@linecount

\or % acmengage

\or % acmcp

\relax

\fi

```
\begin{picture}(0,0)%
                   2911
                             \put(20,-22){\usebox{\ACM@linecount@bx}}%
                  2912
                            \end{picture}%
                   2913
                        \fi}
                   2914
   \ACM@timestamp The timestamp system
                   2915 \if@ACM@timestamp
                        % Subtracting 30 from \time gives us the effect of rounding down despite
                        % \numexpr rounding to nearest
                   2917
                        \newcounter{ACM@time@hours}
                   2918
                        \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
                  2919
                        \newcounter{ACM@time@minutes}
                   2920
                   2921
                        \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
                        \newcommand\ACM@timestamp{%
                   2922
                           \footnotesize%
                   2923
                   2924
                           \ifx\@acmSubmissionID\@empty\relax\else
                   2925
                          Submission ID: \@acmSubmissionID.{ }%
                   2926
                          \fi
                           \t \ \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
                   2927
                           \label{two@digits{theACM@time@hours}: two@digits{theACM@time@minutes}{.} \% $$
                   2928
                          Page \thepage\ of \@startPage--\pageref*{TotPages}.%
                   2929
                   2930
                   2931 \fi
   \@shortauthors Even if the author redefined \shortauthors, we do not print it in the headers when in
                   anonymous mode:
                   2932 \def\@shortauthors{%
                   2933
                        \if@ACM@anonymous
                   2934
                          \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
                   2935
                        \else\shortauthors\fi}
                   2936
   \@headfootfont The font to typeset header and footer text.
                   2937 \def\@headfootfont{\sffamily\footnotesize}
standardpagestyle The page style for all pages but the first one The page style for all pages but the first
                   one
                   2938 \AtBeginDocument{%
                   2939 \fancypagestyle{standardpagestyle}{%
                        \fancyhf{}%
                   2940
                        \renewcommand{\headrulewidth}{\z@}%
                   2941
                        \renewcommand{\footrulewidth}{\z@}%
                   2942
                        \def\@acmArticlePage{%
                   2943
                           \ifx\@acmArticle\empty%
                   2944
                             \if@ACM@printfolios\thepage\fi%
                   2945
                   2946
                           \else%
                   2947
                             \@acmArticle\if@ACM@printfolios:\thepage\fi%
                   2948
                           \fi%
                        }%
                   2949
                        \if@ACM@journal@bibstrip
                   2950
                           \ifcase\ACM@format@nr
                   2951
                           \relax % manuscript
                   2952
                             \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
                   2953
```

```
\fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2954
         \fancyhead[RE]{\@shortauthors}%
2955
         \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2956
         \if@ACM@nonacm\else%
2957
           \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2958
         \fi%
2959
       \or % acmsmall
2960
         \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2961
         \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2962
         \fancyhead[RE]{\@headfootfont\@shortauthors}%
2963
         \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2964
         \if@ACM@nonacm\else%
2965
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2966
          \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2967
2968
       \or % acmlarge
2969
         \fancyhead[LE]{\ACM@linecountL\@headfootfont
         \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
         \fancyhead[LO]{\ACM@linecountL}%
2972
         \fancyhead[RO]{\@headfootfont
2973
           \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2974
         \if@ACM@nonacm\else%
2975
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2976
          \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2977
2978
2979
       \or % acmtog
         \fancyhead[LE]{\ACM@linecountL\@headfootfont
2980
           \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2981
         \fancyhead[LO]{\ACM@linecountL}%
2982
2983
         \fancyhead[RE]{\ACM@linecountR}%
         \fancyhead[RO]{\@headfootfont
2984
           \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2985
         \if@ACM@nonacm\else%
2986
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2987
          \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2988
2989
       \else % Proceedings
2990
         \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
         \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2993
         \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
         \if@ACM@nonacm
2994
2995
           \fancyhead[LE]{\ACM@linecountL}%
           \fancyhead[RO]{\ACM@linecountR}%
2996
         \else%
2997
           \if@ACM@engage
2998
             \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
2999
               3000
             \footnotemark
3001
               EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3002
3003
               \ACM@linecountR}%
3004
           \else
             3005
               \acmConference@shortname,
3006
               \acmConference@date, \acmConference@venue}%
3007
```

```
\footnotemark
3008
            \acmConference@shortname,
3009
            \acmConference@date, \acmConference@venue\ACM@linecountR}%
3010
          \fi
3011
       \fi
3012
      \fi
3013
    \else % Proceedings
3014
      \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3015
      \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3016
      3017
      \if@ACM@nonacm
3018
        \fancyhead[LE]{\ACM@linecountL}%
3019
        \fancyhead[RO]{\ACM@linecountR}%
3020
      \else%
3021
        \if@ACM@engage
3022
         \fancyhead[LE]{\ACM@linecountL\@headfootfont
3023
           EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3024
         \footnotemark
           \ACM@linecountR}%
        \else
         3029
           \acmConference@shortname,
3030
           \acmConference@date, \acmConference@venue}%
3031
         \footnotemark
3032
3033
           \acmConference@shortname,
           \acmConference@date, \acmConference@venue\ACM@linecountR}%
3034
        \fi
3035
      \fi
3036
3037
    \fi
    \if@ACM@sigchiamode
3038
       3039
3040
    \if@ACM@timestamp
3041
      \fancyfoot[LO,RE]{\ACM@timestamp}
3042
3043
    \if@ACM@acmcp
3044
    \renewcommand{\footrulewidth}{0.1\p@}%
3046
    \fancyheadoffset[L]{46pt}%
    \fancyhead[L]{\makebox[\z@][1]{%}
        \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3048
3049
        \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
           \strut\ACM@ArticleType~Article}}}%
3050
      \ACM@linecountL}%
3051
    3052
    \fancyfoot[L,C]{}%
3053
    \fancyfoot[R]{\footnotesize
3054
      \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3055
      \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
3056
3057
      3058
    \fi
3059 }%
3060 \pagestyle{standardpagestyle}
3061 }
```

```
\@folio@wd Folio blob width, height, offsets and max number
     \@folio@ht
\@fo\%fo\ipplet The macro to typeset the folio blob.
 \ensuremath{\mbox{\sc Mefolio@max}}\ firstpagestyle The page style for the first page only.
                3062 \AtBeginDocument{%
                3063 \fancypagestyle{firstpagestyle}{%
                3064
                      \fancyhf{}%
                      \renewcommand{\headrulewidth}{\z@}%
                3065
                      \renewcommand{\footrulewidth}{\z@}%
                3066
                3067
                      \if@ACM@journal@bibstrip
                        \ifcase\ACM@format@nr
                3068
                3069
                        \relax % manuscript
                3070
                          \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
                3071
                          \fancyhead[R]{\@acmBadgeR}%
                          \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
                3072
                3073
                          \if@ACM@nonacm\else%
                            \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
                3074
                3075
                        \or % acmsmall
                3076
                3077
                          \if@ACM@nonacm\else%
                         3079
                            \@acmNumber, Article \@acmArticle. Publication date:
                3080
                            \@acmPubDate.}%
                3081
                          \fi%
                          \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
                3082
                          \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
                3083
                3084
                          \fancyhead[RO]{\@acmBadgeR}%
                          \fancyhead[RE]{\@acmBadgeR}%
                3085
                        \or % acmlarge
                3086
                3087
                          \if@ACM@nonacm\else%
                3088
                         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
                3089
                            \@acmNumber, Article \@acmArticle. Publication date:
                3090
                            \@acmPubDate.}%
                          \fi%
                3091
                          \fancyhead[RO]{\@acmBadgeR}%
                3092
                          \fancyhead[RE]{\@acmBadgeR}%
                3093
                          \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
                3094
                          \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
                3095
                        \or % acmtog
                3096
                3097
                          \if@ACM@nonacm\else%
                         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
                            \@acmNumber, Article \@acmArticle. Publication date:
                3100
                            \@acmPubDate.}%
                          \fi%
                3101
                          \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
                3102
                          \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
                3103
                        \else % Conference proceedings
                3104
                          \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
                3105
                          \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
                3106
                          \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
                3107
                3108
                        \fi
                3109
                      \else
                        \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
                3110
```

```
\fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3111
       \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3112
     \fi
3113
     \if@ACM@timestamp
3114
       \ifnum\ACM@format@nr=0\relax % Manuscript
3115
       \foot[LO,RE]{\ACM@timestamp\quad}
3116
         \if@ACM@nonacm\else
3117
           \footnotesize Manuscript submitted to ACM
3118
3119
         \fi}
       \else
3120
       \fancyfoot[LO,RE]{\ACM@timestamp}
3121
       \fi
3122
     \fi
3123
     \if@ACM@acmcp
3124
     \renewcommand{\footrulewidth}{0.1\p@}%
3125
     \fancyheadoffset[L]{46pt}%
3126
     \fancyhead[L]{\makebox[\z@][1]{%
3127
         \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3128
         \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3129
             \strut\ACM@ArticleType~Article}}}%
3130
       \ACM@linecountL\@acmBadgeL}%
3131
     \fancyhead[R]{\@acmBadgeR\makebox[\z@][r]{\box\@ACM@acmcpbox}}%
3132
     \fancyfoot[L,C]{}%
3133
     \fancyfoot[R]{\footnotesize
3134
       \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3135
3136
       \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
       3137
    \fi
3138
3139 }}
```

3.23 Sectioning

\ACM@NRadjust Ross Moore's macro.

Initially \ACM@sect@format@ just passes through its #1 argument unchanged. When a sectioning macro such as \section occurs, the \ACM@NRadjust redefines \ACM@sect@format@ to expand into the styling commands; e.g., \@secfont. Then \Sectionformat is temporarily redefined to produce \realSectionformat{\ACM@sect@format{#1}}{#2}, which ultimately becomes \Sectionformat{\@secfont{#1}}{#2}. This is done to allow \Sectionformat to be variable, as may be needed in particular circumstances. Its current expansion is saved as \realSectionformat which is used with the modified 1st argument, then \Sectionformat is reverted to its former expansion.

To style the section-number, the line #1{} is used at the end of \ACM@NRadjust. This imposes style-changing commands for fonts and sizes, but any \MakeUppercase acts on just the {}. It's a bit hacky, by essentially assuming that only numbers occur here, not letters to be case-changed. (This should be acceptable in a class-file, as it ought to be possible to change the case elsewhere, if that was ever desired.) Also, it can result in \@adddotafter being called too soon, so a slight adjustment is made, via \ACM@adddotafter, which now tests whether its argument is empty. But the coding has to allow for other packages to have also patched \@adddotafter.

```
3140 \def\ACM@NRadjust#1{%
                                                            3141 \begingroup
                                                                       \expandafter\ifx\csname Sectionformat\endcsname\relax
                                                            3142
                                                                       % do nothing when \Sectionformat is unknown
                                                            3143
                                                                         \def\next{\endgroup #1}%
                                                            3144
                                                            3145 \else
                                                                      \def\next{\endgroup
                                                            3146
                                                                         \let\realSectionformat\Sectionformat
                                                            3147
                                                                         \def\ACM@sect@format@{#1}%
                                                            3148
                                                                         \let\Sectionformat\ACM@NR@adjustedSectionformat
                                                            3149
                                                            3150 %% next lines added 2018-06-17 to ensure section number is styled
                                                                         \let\real@adddotafter\@adddotafter
                                                            3151
                                                                         \let\@adddotafter\ACM@adddotafter
                                                            3152
                                                                         #1{}% imposes the styles, but nullifies \MakeUppercase
                                                            3153
                                                                         \let\@adddotafter\real@adddotafter
                                                            3154
                                                                       }%
                                                            3155
                                                            3156 \fi \next
                                                            3157 }
\ACM@NR@adjustedSectionformat
                                                            3158 \def\ACM@NR@adjustedSectionformat#1#2{%
                                                            3159 \realSectionformat{\ACM@sect@format{#1}}{#2}%
                                                            3160 \let\Sectionformat\realSectionformat}
                                                            {\tt 3161 \setminus DeclareRobustCommand\{\setminus ACM@sect@format\}\{\setminus ACM@sect@format@\}} \\
                                                            3162 \def\ACM@sect@format@null#1{#1}
                                                            3164 \AtBeginDocument{%
                                                            3165 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
                                                                      \let\LTX@adddotafter\@adddotafter
                                                            3167 \fi
                                                            3168 }
                                                            \label{lem:condition} $$169 \det ACM@adddotafter#1{\left(\frac{11}{\pi}\right)} $$
                                                                   Sectioning is different for different levels
                                                            3170 \renewcommand\section{\@startsection{section}{1}{\z@}%
                                                            \{-.75\baselineskip \eqlus -2\p@ \eminus -.2\p@}%
                                                                       {.25\baselineskip}%
                                                            3173 {\ACM@NRadjust\@secfont}}
                                                            3174 \ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath
                                                            \{-.75\baselineskip \eqlus -2\p@ \eqlus -.2\p@}%
                                                            3176 {.25\baselineskip}%
                                                            3177 {\ACM@NRadjust\@subsecfont}}
                                                            3178 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
                                                            \{-.5\} {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
                                                            3181 {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
                                                            3182 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
                                                            \{-.5\baselineskip \eqrup -2\p@ \eqrup -.2\p@}
                                                            3184 {-3.5\p@}%
                                                            3185 {\ACM@NRadjust{\@parfont\@adddotafter}}}
                                                            3186 \newcommand\noindentparagraph{\@startsection{paragraph}{4}{\z@}%
                                                            \{-.5\baselineskip \eqrup -2\p@ \eqrup -.2\p@}
```

\ACM@adddotafter

```
\{-3.5\p0\}\%
                                         3188
                                                   {\ACM@NRadjust{\@parfont}}}
                                         3189
                                         3190
                                         3191 \renewcommand\part{\@startsection{part}{9}{\z@}%
                                         3192 {-10\p@ \@plus -4\p@ \@minus -2\p@}%
                                                  {4\p@}%
                                         3193
                                                  {\ACM@NRadjust\@parfont}}
\verb|\section@raggedright| Special version of \verb|\scale=| argedright| compatible with \verb|\scale=| argedright| special version of argedright| specia
                                         3195 \def\section@raggedright{\@rightskip\@flushglue
                                                 \rightskip\@rightskip
                                         3196
                                                  \leftskip\z@skip
                                         3197
                                         3198 \parindent\z@}
                     \@secfont Fonts for sections etc. are different for different formats.
               \@subsubsecfont 3200 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
                     \@parfont 3201 \def\@subsubsecfont{\sffamily\itshape}
                                         3202 \def\@parfont{\itshape}
                                         3203 \setcounter{secnumdepth}{3}
                                         3204 \ifcase\ACM@format@nr
                                         3205 \relax % manuscript
                                         3206 \or % acmsmall
                                         3207 \or % acmlarge
                                         3208 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
                                         3209 \def\@subsecfont{\sffamily\large\section@raggedright}
                                         3210 \or % acmtog
                                         3211 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
                                         3212 \def\@subsecfont{\sffamily\large\section@raggedright}
                                         3213 \or % sigconf
                                         3214 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
                                         3215 \def\@subsecfont{\bfseries\Large\section@raggedright}
                                         3216 \or % siggraph
                                         3217 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
                                         3218 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
                                         3219 \or % sigplan
                                         3220 \def\@secfont{\bfseries\Large\section@raggedright}
                                         3221 \def\@subsecfont{\bfseries\section@raggedright}
                                         3222 \def\@subsubsecfont{\bfseries\section@raggedright}
                                         3223 \def\@parfont{\bfseries\itshape}
                                         3224 \def\@subparfont{\itshape}
                                         3225 \or % sigchi
                                         3226 \setcounter{secnumdepth}{1}
                                         3227 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
                                         3228 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
                                         3229 \or % sigchi-a
                                         3230 \setcounter{secnumdepth}{0}
                                         3231 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
                                         3232 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
                                         3233 \or % acmengage
                                         3234 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
                                         3235 \def\@subsecfont{\bfseries\Large\section@raggedright}
                                         3236 \or %acmcp
```

3237 \fi

3.24 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.

3243 \providecommand*\@dotsep{4.5}

3.25 Theorems

 $\verb|\@acmplainbodyfont| The font to type set the body of the acmplain theorem style.$

3244 \def\@acmplainbodyfont{\itshape}

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

3245 \def\@acmplainindent{\parindent}

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

3246 \def\@acmplainheadfont{\scshape}

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

3247 \def\@acmplainnotefont{\@empty}

Customization of the acmplain theorem style:

```
3248 \ifcase\ACM@format@nr
3249 \relax % manuscript
3250 \or % acmsmall
3251 \or % acmlarge
3252 \or % acmtog
3253 \or % sigconf
3254 \or % siggraph
3255 \or % sigplan
3256 \def\@acmplainbodyfont{\itshape}
     \def\@acmplainindent{\z@}
3257
     \def\@acmplainheadfont{\bfseries}
3259 \def\@acmplainnotefont{\normalfont}
3260 \or % sigchi
3261 \or % sigchi-a
3262 \or % acmengage
3263 \or % acmcp
3264\fi
```

```
acmplain The acmplain theorem style
                        3265 \newtheoremstyle{acmplain}%
                             {.5\baselineskip\@plus.2\baselineskip
                        3266
                               \@minus.2\baselineskip}% space above
                        3267
                             {.5\baselineskip\@plus.2\baselineskip
                        3268
                        3269
                               \@minus.2\baselineskip}% space below
                        3270
                             {\@acmplainbodyfont}% body font
                             {\@acmplainindent}% indent amount
                        3272
                             {\@acmplainheadfont}% head font
                        3273
                             {.}% punctuation after head
                             {.5em}% spacing after head
                        3274
                            3275
\@acmdefinitionbodyfont The font to typeset the body of the acmdefinition theorem style.
                        3276 \def\@acmdefinitionbodyfont{\normalfont}
  \@acmdefinitionindent The amount to indent the acmdefinition theorem style.
                        3277 \def\@acmdefinitionindent{\parindent}
\@acmdefinitionheadfont The font to typeset the head of the acmdefinition theorem style.
                        3278 \def\@acmdefinitionheadfont{\itshape}
\@acmdefinitionnotefont The font to typeset the note of the acmdefinition theorem style.
                        3279 \def\@acmdefinitionnotefont{\@empty}
                           Customization of the acmdefinition theorem style:
                        3280 \ifcase\ACM@format@nr
                        3281 \relax % manuscript
                        3282 \or % acmsmall
                        3283 \or % acmlarge
                        3284 \or % acmtog
                        3285 \or % sigconf
                        3286 \or % siggraph
                        3287 \or % sigplan
                            \def\@acmdefinitionbodyfont{\normalfont}
                             \def\@acmdefinitionindent{\z@}
                        3289
                        3290 \def\@acmdefinitionheadfont{\bfseries}
                        3291 \def\@acmdefinitionnotefont{\normalfont}
                        3292 \or % sigchi
                        3293 \or % sigchi-a
                        3294 \or % acmengage
                        3295 \or % acmcp
                        3296\fi
         acmdefinition The acmdefinition theorem style
                       3297 \newtheoremstyle{acmdefinition}%
                             {.5\baselineskip\@plus.2\baselineskip
                        3298
                               \@minus.2\baselineskip}% space above
                        3299
                             {.5\baselineskip\@plus.2\baselineskip
                        3300
                        3301
                               \@minus.2\baselineskip}% space below
                             {\@acmdefinitionbodyfont}% body font
                        3302
                             {\@acmdefinitionindent}% indent amount
                             {\@acmdefinitionheadfont}% head font
```

```
3305 {.}% punctuation after head
3306 {.5em}% spacing after head
3307 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
```

Make acmplain the default theorem style.

```
3308 \theoremstyle{acmplain}
```

Delay defining the theorem environments until after other packages have been loaded. In particular, the cleveref package must be loaded before the theorem environments are defined in order to show the correct environment name (see https://github.com/borisveytsman/acmart/issues/138). The acmthm option is used to suppress the definition of any theorem environments. Also, to avoid obscure errors arising from these environment definitions conflicting with environments defined by the user or by user-loaded packages, we only define environments that have not yet been defined.

```
3309 \AtEndPreamble{%
                      \if@ACM@acmthm
                 3310
                       \theoremstyle{acmplain}
                 3311
                       \@ifundefined{theorem}{%
                 3312
                       \newtheorem{theorem}{Theorem}[section]
                 3313
                 3314
                       \@ifundefined{conjecture}{%
                 3315
                       \newtheorem{conjecture}[theorem]{Conjecture}
                 3316
                 3317
                       \@ifundefined{proposition}{%
                 3318
                 3319
                       \newtheorem{proposition}[theorem]{Proposition}
                 3320
                 3321
                       \@ifundefined{lemma}{%
                       \newtheorem{lemma}[theorem]{Lemma}
                 3322
                 3323
                       \@ifundefined{corollary}{%
                 3324
                       \newtheorem{corollary}[theorem]{Corollary}
                 3325
                 3326
                       \theoremstyle{acmdefinition}
                 3327
                       \@ifundefined{example}{%
                 3328
                       \newtheorem{example}[theorem]{Example}
                 3329
                 3330
                       \@ifundefined{definition}{%
                 3331
                       \newtheorem{definition}[theorem]{Definition}
                 3332
                      }{}
                 3333
                       \fi
                 3334
                       \theoremstyle{acmplain}
                 3335
                 3336 }
\@proofnamefont The font to typeset the proof name.
                 3337 \def\@proofnamefont{\scshape}
  \@proofindent Whether or not to indent proofs.
                 3338 \def\@proofindent{\indent}
                     Customization of the proof environment.
                 3339 \ifcase\ACM@format@nr
                 3340 \relax % manuscript
```

```
3341 \or % acmsmall
      3342 \or % acmlarge
      3343 \or % acmtog
      3344 \or % sigconf
      3345 \or % siggraph
      3346 \or % sigplan
           \def\@proofnamefont{\itshape}
           \def\@proofindent{\noindent}
      3349 \or % sigchi
      3350 \or % sigchi-a
      3351 \or % acmengage
      3352 \or % acmcp
      3353 \fi
proof We want some customization of the proof environment.
      \pushQED{\qed}%
            \normalfont $$ \operatorname{p@\plus6\p@\relax} $$ \normalfont $$ \operatorname{pehlus6\p@\relax} $$
      3356
      3357
            \trivlist
            \item[\@proofindent\hskip\labelsep
      3358
                  {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
      3359
      3360 }{%
            \popQED\endtrivlist\@endpefalse
      3361
      3362 }
```

3.26 Balancing columns

We need balancing only if the user did not disable it, and we use a two column format. Note that pbalance uses a different mechanism.

```
3363 \AtEndPreamble{%
     \if@ACM@pbalance
3364
        \global\@ACM@balancefalse
3365
        \ifcase\ACM@format@nr
3366
        \relax % manuscript
3367
           \or % acmsmall
3368
           \or % acmlarge
3369
           \or % acmtog
3370
3371
              \RequirePackage{pbalance}%
3372
           \or % sigconf
3373
              \RequirePackage{pbalance}%
3374
           \or % siggraph
3375
              \RequirePackage{pbalance}%
3376
           \or % sigplan
              \RequirePackage{pbalance}%
3377
           \or % sigchi
3378
              \RequirePackage{pbalance}%
3379
3380
           \or % sigchi-a
3381
           \or % acmengage
              \RequirePackage{pbalance}%
3382
3383
           \or % acmcp
       \fi
3384
     \fi
3385
     \if@ACM@balance
3386
```

```
\ifcase\ACM@format@nr
               3387
                      \relax % manuscript
               3388
                            \global\@ACM@balancefalse
               3389
                          \or % acmsmall
               3390
                            \global\@ACM@balancefalse
               3391
                          \or % acmlarge
               3392
                            \global\@ACM@balancefalse
               3393
               3394
                          \or % acmtog
                             \RequirePackage{balance}%
               3395
               3396
                          \or % sigconf
                             \RequirePackage{balance}%
               3397
                          \or % siggraph
               3398
                             \RequirePackage{balance}%
               3399
                          \or % sigplan
               3400
                             \RequirePackage{balance}%
               3401
                          \or % sigchi
               3402
                             \RequirePackage{balance}%
               3403
                          \or % sigchi−a
                             \global\@ACM@balancefalse
               3405
               3406
                          \or % acmengage
                             \RequirePackage{balance}%
               3407
                          \or % acmcp
               3408
                            \global\@ACM@balancefalse
               3409
                      \fi
               3410
              3411
                    \fi
              3412 }
              3413 \AtEndDocument{%
              3414 \if@ACM@balance
               3415 \if@twocolumn
               3416
                   \balance
               3417 \fi\fi}
                      Acknowledgments
               3.27
    \acksname
               3418 \newcommand\acksname{Acknowledgments}
        \acks This is a comment-like structure
               3419 \specialcomment{acks}{%
                    \begingroup
               3420
                    \section*{\acksname}
               3421
                    \phantomsection\addcontentsline{toc}{section}{\acksname}
               3422
               3423 }{%
                    \endgroup
               3424
               3425 }
\grantsponsor We just typeset the name of the sponsor
               3426 \def\grantsponsor#1#2#3{#2}
    \grantnum
               3427 \newcommand\grantnum[3][]{#3%
```

3.28 Conditional typesetting

We use the comment package for conditional typesetting:

```
3429 \AtEndPreamble{%
3430 \if@ACM@screen
     \includecomment{screenonly}
     \excludecomment{printonly}
3432
3433 \else
     \excludecomment{screenonly}
3434
     \includecomment{printonly}
3435
3436\fi
3437 \if@ACM@anonymous
     \excludecomment{anonsuppress}
3439
     \excludecomment{acks}
3440 \else
3441 \includecomment{anonsuppress}
3442 \fi}
```

3.29 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'.

```
3443 \newcommand\showeprint[2][arxiv]{%
      \def\@tempa{#1}%
3444
      \  \ifx\ \ensuremath{\mbox{\tt dempty\def\\\mbox{\tt empa{arxiv}}}\  \
3445
      \def\@tempb{arxiv}%
3446
      \ifx\@tempa\@tempb\relax
3447
          arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3448
3449
          \def\@tempb{arXiv}%
3450
          \ifx\@tempa\@tempb\relax
3451
            arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3452
3453
          \else
            #1:#2%
3454
        \fi
3455
     \fi}
3456
```

3.30 Index

\theindex Standard amsart uses plain page style in index pages. This clashes with line numbering for review option, so we redefine it.

```
3457 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3458 \columnseprule\z@ \columnsep 35\p@
3459 \@indextitlestyle
3460 \let\item\@idxitem
3461 \parindent\z@ \parskip\z@\@plus.3\p@\relax
3462 \raggedright
3463 \hyphenpenalty\@M
3464 \footnotesize}
```

3.31 End of Class

\vspace We do not disable \vspace, but add warning to it

```
3466 \let\@vspacer@orig=\@vspacer
                                                                                                                                                       {\tt 3467 \ apptocmd{\ensuremath{\classWarning{\ensuremath{\classname}{\string\string\string}}} } \label{thm:linear}
                                                                                                                                                                                                   only be used to provide space above/below surrounding
                                                                                                                                                       3468
                                                                                                                                                        3469
                                                                                                                                                                                                   objects}}{}{}
                                                                                                                                                        3470 \Rightarrow (\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensurem
                                                                                                                                                                                                   only be used to provide space above/below surrounding
                                                                                                                                                                                                   objects}}{}{}
                                                                                                                                                        3473 \le 0
                                                                                                                                                       3474 \let\@vspacer@acm=\@vspacer
\ACM@origbaselinestretch We produce an error if the user tries to change \baselinestretch
                                                                                                                                                       3475 \let\ACM@origbaselinestretch\baselinestretch
                                                                                                                                                       {\tt 3476 \ At End Document \{ \ if x \ baselinest retch \ ACM@origbase linest retch \ linest retch \ acknowledges a substitution of the control of the contr
                                                                                                                                                                                     \ClassError{\@classname}{An attempt to redefine
                                                                                                                                                       3478
                                                                                                                                                                                                   \string\baselinestretch\space detected. Please do not do this for
                                                                                                                                                       3479
                                                                                                                                                                                                   ACM submissions!}\fi}
                                                                                                                                                       3480 \normalsize\normalfont\frenchspacing
                                                                                                                                                       3481 (/class)
```

3465 \let\@vspace@orig=\@vspace

References

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Change History

1.48	\ccsdesc@parse: Added warning for
General: Added prologue option to	missing concepts 78
xcolor 51	\if@ACM@printacmref: Added
Bib code cleanup (Zack Weinberg) 36	warning for longer papers 75
Documentation update (siggraph) . 36	\keywords: Added warning for
1.49	missing keywords
General: New journal: DTRAP 36	1.69
1.53	\vspace: Added the changed
General: New journals: PACMCGIT,	command to avoid grouping 114
TIOT, TDSCI 36	1.70
Rearranged docs	General: Name change for TDS 60
1.54	1.71
General: Moved footnote stuff before	General: Bibliography change: volume
hyperref call (Ross Moore) 36	for @inproceedings is now in
1.56	brackets together with series 36
General: Documented \Description 36	LuaTeX now uses the OTF versions
1.57	of fonts
General: Booktabs package is now the	Retired sigchi and sigchi-a 36
default	1.75
1.58	General: Documentation update 36
General: Changes in samples (Enrico	1.78
Gregorio)	General: Documentation update: Word
New journal: HEALTH. TDS is	count
renamed to TDSCI 36	1.79
1.60	General: Updated indormation for
General: New option:	TAP, TCPS, TEAC 60
urlbreakonhyphens	1.80
\if@ACM@urlbreakonhyphens:	General: Added DLT and FAC 60
introduced macro 37	1.82
1.62	General: Updated abbreviations and
General: New journal: TELO 36	codes for several journals 60
1.63	1.84
General: New journal: FACMP 36	General: New journals: JDS,
New journal: TQUANT	GAMES
1.63a	1.85
General: Move: TQUANT to TQC 36	General: Added CC licenses 36
1.64	Added: acmengage 49
General: Putting abstract after	New journal: JRC 60
\maketitle now causes an error . 36	\@mkauthors: Added: acmengage 92
1.65	\@mktitle: Added: acmengage 89
General: New journal: DGOV 36	\@parfont: Added: acmengage 108
1.66	\@printtopmatter: Added:
General: ACM reference format is now	acmengage
mandatory for papers over one	\@specialsection: Added:
page; CCS concepts and keywords	acmengage88
are now mandatory for papers	\@subtitlefont: Added: acmengage 90
over two pages	
Authors' addresses are mandatory	\ACM@linecountR: Added:
for journal articles	acmengage 101
\@mkauthorsaddresses: Added	format: New format: acmengage 37
warning for missing addresses 98	

1.87	//github.com/borisveytsman/
General: New journals: ACMJCSS,	acmart/issues/9) 36
JATS, TORS 60	\@formatdoi: Added macro 80
format: New format: acmcp 37	\if@ACM@authorversion: Added
1.88	macro
General: Added ISSN for ACMJCSS . 60	
Added ISSN for GAMES 60	authorversion 84
Added PACMNET 60	v1.04
1.89	General: Updated bibliography for
General: Added PACMMOD 60	515gruph
Added TOPML 60	(domini orozoodi ridirie oridinge z)
\@printtopmatter: Moved badges to	Matthew Fluet
top header	\acmDOI: Name change by Matthew
1.90	Fluet
General: Added TOPML eISSN 60	\acmISBN: Name change by Matthew
1.90a	Fluet
General: Changes in the sample	v1.05
keywords and concepts 36	
1.92	numbers for acmsiggraph and doi
General: Documentation update: use	numbers for sigproc.bib 36
of 'anonymous' throughout 36	- attended (000010000) 10 communa,
Moved hyperxmp again due to	closes https:
kernel update 49	//github.com/boi isveytoman/
v1.00	acmart/issues/19 36
General: First released version 36	v1.06
v1.01	\@ACM@badge@skip: Added macro 73
General: Changed hyperref colors in	\@ACM@badge@width: Added macro . 73
screen mode (closes https:	\@ACM@title@width: Added macro . 73
//github.com/borisveytsman/	\@mktitle@i: Added processing
acmart/issues/1) 36	badges
Defined ACM colors	Made generic 91
Explicitly put draft option (closes	\@mktitle@ii: Now this macro is
https:	obsolete 91
//github.com/borisveytsman/	\@mktitle@iii: Added processing
acmart/issues/4) 39	badges
Set headheight to 1pc for all	Made more generic
formats (closes https:	\@mktitle@iv: Made more generic . 91
//github.com/borisveytsman/	\@printtopmatter: Added processing
acmart/issues/5) 36	badges
v1.02	\@subtitlefont: Added macro 90
General: Added TOPS and TSC (closes	\@titlefont: Added macro 90
https:	\acmBadgeL: Added macro 74
//github.com/borisveytsman/	\acmBadgeR: Added macro
acmart/issues/12) 36	
Documentation changes (closes	v1.07
https:	\maketitle: Corrected a bug with abstract footnotes
//github.com/borisveytsman/	
acmart/issues/13) 36	
v1.03	and footnotes order 84
General: Added anonsuppress	v1.08 Conoral, SICDI AN reformatting by
environment	General: SIGPLAN reformatting by Matthew Fluet
Added authorversion option (closes https:	Typos corrected (Tobias Pape) 36
HILLUS.	TYDUS COTTECTED (TODIAS FADE)

v1.09	standardpagestyle: Added headers
General: Revert SIGPLAN caption	for sigs
rules	Expanded headers for sigchi-a 102
v1.10	Suppressed folios if sig 102
General: Changes of	v1.14
'licensedothergov' wording 78	General: \citestyle updates
\maketitle: Corrected a bug with doi	(Matthew Fluet)
in manuscript and author vertsion,	Patched \citestyle 42
https:	\bibstyle@acmauthoryear: Moved
//github.com/borisveytsman/	<pre>def of \bibstyle@acmauthoryear</pre>
acmart/issues/36 84	before use
standardpagestyle: Reversed folios	\bibstyle@acmnumeric: Moved def of
location 102	$\begin{tabular}{ll} \begin{tabular}{ll} \beg$
v1.11	v1.15
General: Customization of ACM	\@ACM@addtoaddress: Added macro 92
theorem styles and proof	\@mkauthors@iii: New authors
environment by Matthew Fluet 36	system
v1.12	\@shortauthors: Introduced macro . 102
General: Added graceful behavior	\@typeset@author@bx: Moved to
when libertine fonts are absent \dots 55	separate macro
Documentation updates 36	\acks: Added macro 113
\@marginfigure: Now centering by	\affiliation: Added code for author
default 58	groups
\@margintable: Now centering by	groups
default	\city: Added macro 92
\@parfont: Moved to	\country: Added macro 92
\section@raggedright 108	\department: Added macro 92
$\copyright permission foot note rule:$	\grantnum: Added macro 113
Added macro 53	\grantsponsor: Added macro 113
\descriptionlabel: Redefined 60	\if@insideauthorgroup: Introduced
\footnoterule: Made shorter 54	macro 69
\if@ACM@natbib@override: Added	\institution: Added macro 92
macro	\num@authorgroups: Renamed 69
\if@ACM@newfonts: Added macro 55	\orcid: Introduced macro 71
\maketitle: Moved thankses to	\position: Added macro 92
copyrightpermission box 84	\postcode: Added macro 92
\section@raggedright: Introduced	\state: Added macro 92
macro	\streetaddress: Added macro 92
v1.13	standardpagestyle: Better handling
General: Font adjustments for	of anonymous mode 102
acmsmall 93	v1.16
Increased font size for ACM Large 41	General: Formatting header/footer
Print bibliographic information by	(Matthew Fluet)
default for the proceedings 75	\@headfootfont: Added macro 102
\@mpfootnotetext: Made minipage	standardpagestyle: Customize
footnotes centered 49	header/footer text font 102
\bibliographystyle: Redefined	v1.17
macro 50	General: Slightly decreased margins
\bibstyle@acmauthoryear: Added	for sigs
macro	\@makefnmark: Redefined 49
\bibstyle@acmnumeric: Added	\@mkauthors: TOG now uses the same
macro	authors block as other journals 92
\if@ACM@printfolios: Added macro 75	\@mkauthors@ii: Deleted 95

\@mkbibcitation: Added \nobreak 99	Documentation typos fixed (thanks
Changed format for sigs 99	to Stephen Spencer)
\acmArticle: The default is now	v1.27
numerical	\if@ACM@printccs: Typo corrected . 75 v1.28
\acmMonth: The default must be numerical. Closes #50	
\acmNumber: The default is now	General: Corrected option natbib behavior
numerical	Got rid of warnings in pdf keywords 49
\acmVolume: The default is now	\ccsdesc@parse: Change from \to to
numerical	\textrightarrow (Matteo
\acmYear: The default is now	Riondato)
numerical	v1.29
\description: Decreased indent 60	General: Increased head to 13pt 51
\grantnum: Added url 113	\@mkabstract: Removed spurious
\grantsponsor: Renamed 113	indentation (John Wickerson) 99
\if@ACM@printacmref: Renamed	\ccsdesc@parse: Add spacing after
from \if@ACM@printbib 75	bullet and around rightarrow;
standardpagestyle: Added paper	semicolon separators no longer in
title to sigs 102	bold/italic (John Wickerson) 77
v1.18	standardpagestyle: Corrected
General: Natbib is now the default for	printfolios (Matthew Fluet) 102
all formats	v1.30
\@mkauthors@i: Now we andify	General: Added \frenchspacing 115
affiliations	Bibtex style now recognizes https://
\@typeset@author@line: Added	in doi 36
macro 94	Switched to T1: looks like libertine
v1.19	has problems with \l in OT1 55
General: Include 'Abstract',	Updated IMWUT and PACMPL 60
'Acknowledgements', and	\department: Added optional
'References' in PDF bookmarks	parameter 92
(Matthew Fluet)	v1.31
Include 'References' in PDF	General: Documentation changes 36 \@additionalaffiliation: Added
bookmarks (Matthew Fluet) 42	macro
\@mkabstract: Include 'Abstract' in	\@mkbibcitation: Disabled linebreak 99
PDF bookmarks (Matthew Fluet) . 99	\@startsection: Added
\acks: Include 'Acknowledgements' in	\tochangmeasure 46
PDF bookmarks (Matthew Fluet) 113	Redefined macro 48
v1.20	\@textbottom: Redefined 54
General: Bug fixes for bst 36	\acmMonth: The default now is the
\@mkabstract: Deleted spurious space 99	current month (Matteo Riondato) 72
v1.21	\acmYear: The default now is the
\showeprint: Added macro 114	current year (Matteo Riondato) 72
v1.22	\additionalaffiliation: Added
General: More bibliography changes	macro 70
for Aptara 36	\1@subsection: Redefined macro 48
v1.23	\1@subsubsection: Redefined macro 48
General: Add PACMPL journal option 36	v1.32
v1.24	General: Added POMACS journal
General: Add IMWUT journal option 60	option
v1.25	Format siggraph is now obsolete . 36
General: Updated PACMPL 60	\@formatdoi: New doi format 80
v1.26	v1.33
General: Corrected \shortcite bug . 36	General: Added acmart-preload-hook 36

Added cmap and glyphtounicode . 55	\state: Added obeypunctuation code 92
BibTeX comma before articleno bug	\streetaddress: Added
corrected	obeypunctuation code 92
BibTeX crossref bug corrected 36	standardpagestyle: Added right
BibTeX numpages bug corrected . 36	linecount for two-column formats 102
Documentation updates 36	Added timestamp (Michael
Moved \citename definition for	D. Adams) 102
non-natbib bibliography, so a	v1.34
package may redefine it 50	\@mkbibcitation: Deleted DOI from
Switched to Type 1 fonts for	doi numbers 99
libertine even if OTF-capable	\ACM@linecount@bx: Rulers now are
engine is used (Kai Mindermann) . 55	continuous 101
\@ACM@addtoaddress: Added	\ACM@linecountL: Rulers now are
obeypunctuation code 92	continuous 101
\@mkauthors@i: Added	\ACM@linecountR: Rulers now are
obeypunctuation code 95	continuous 101
\@mkauthors@iii: Added	\maketitle: Added date to the
obeypunctuation code 96	bibstrip in conf proceedings 84
\@mkauthors@iv: Added	Deleted 'DOI' from doi numbers . 84
obeypunctuation code 97	
\@subtitlefont: Added	Rearranged bibstrip 84 The \terms command is now
\normalsize 90	,
\ACM@linecountL: Renamed macro . 101	obsolete
\ACM@linecountR: Added macro 101	\terms: The \terms command now
\ACM@timestamp: Added current page	just produces a warning 74
number	v1.35
Added macro (Michael D. Adams) . 102	General: BibTeX bug fixed: et al 36
Added submission id 102	If the copyright is set to usgov or
\acmSubmissionID: Added macro 73	rigtsretained, the price is
\city: Added obeypunctuation code 92	suppressed
\country: Added obeypunctuation	\bibstyle@acmauthoryear: Square
code 92	brackets for author-year style 44
\department: Added obeypunctuation	v1.36
code 92	General: Added PACMHCI journal
\if@ACM@affiliation@obeypunctuation:	options 60
Added macro	Added the possibility to adjust
\if@ACM@authordraft: Added macro 39	number of author boxes per row
\if@ACM@natbib@override: Deleted	in conference formats 36
macro	\@ACM@authorsperrow: Added macro 75
\if@ACM@timestamp: Added macro	\@mkauthors@iii: Added
(Michael D. Adams)	authorsperrow overrride 96
\institution: Added	\@mkauthors@iv: Added
obeypunctuation code 92	authorsperrow overrride 97
firstpagestyle: Added right	\if@ACM@authordraft: Corrected
linecount for two-column formats 105	typo, thanks to bargteil 39
	v1.37
Added timestamp (Michael D. Adams)	General: Reduce list indentation
,	(Matthew Fluet) 59
\maketitle: Fixed the bug with	Set \normalparindent; Reduce list
figures on top and bottom of the	indentation (Matthew Fluet) 36
title page, thanks to David Epstein 84	\description: Reduce list
\position: Added obeypunctuation	indentation (Matthew Fluet) 60
code 92	
\postcode: Added obeypunctuation code92	\descriptionlabel: Reduce list indentation (Matthew Fluet) 60
Coue	indentation (Matthew Fluet) 60

\normalparindent: Set	Put theorem defs in a separate style 36
\normalparindent (Matthew	\@acmBooktitle: Added macro 68
Fluet) 53	\@acmEditors: Added macro 68
v1.38	\@editorsAbbrev: Added macro 68
General: Increase default font size for	\@folioblob: Suppress the blob if
SIGPLAN	acmArticleSeq is empty 105
v1.39	\@mkbibcitation: If the paper has
$\ensuremath{\mbox{\sc 0}}$ \@@authornotemark: Added macro . 98	just one page, use 'page' instead of
\authornotemark: Added macro 72	'pages'
v1.40	\ACM@restore@pagestyle: Added
General: Added 'textcase' package 42	macro
Added heightrounded to geometry 51	\acmArticle: The default is now
Added new copyright version:	empty
licensedcagov	\acmArticleSeq: Now acmArticle
Added package cleveref 36	might be empty 72
Added Ross Moore code for	\acmBooktitle: Added macro 68
glyphtounicode 55	\editor: Added macro 68
Bibliography changes 36	\if@ACM@acmthm: Added macro 37
\@copyrightowner: Added new	\maketitle: Empty DOI or ISBN are
copyright version: licensedcagov . 79	not printed (by Michael Ekstrand) 84
\@copyrightpermission: Added new	v1.45
copyright version: licensedcagov . 80	\@folioblob: Switched
\@mkauthors@i: Switched to	\bfeseries\sffamily to
MakeTextUppercase 95	\sffamily\bfseries 105
\@parfont: Switched to	\@parfont: Switched
MakeTextUppercase 108	\bfeseries\sffamily to
\ACM@linecount@bx: Work around a	\sffamily\bfseries 108
bug in xcolor: looks like cmyk	\@titlefont: Switched
colors in boxes do not work 101	\bfeseries\sffamily to
\ccdesc@parse@finish: Added	\sffamily\bfseries 90
macro	v1.46
\city: We now do not print this even	General: Added etoolbox 36
in SIG 92	Bst file bug fixes: label width is
\country: Fixed bugs with extra	calculated correctly
spaces	Delayed hypersetup since journal
\1@subsection: Redefined macro 48	options may change screen mode 49
\postcode: We now do not print this	PACM now set screen to true 60
even in SIG	
\state: We now do not print this even	
in SIG	\@mkauthorsaddresses: Introduced macro98
\streetaddress: We now do not	
print this even in SIG 92	\@mkbibcitation: Added subtitle 99
v1.41	\@printendtopmatter: Made it
General: Added new badges 36	\par\bigskip uniformly 100
v1.42	\@printtopmatter: Deleted rule 88
General: Deleted ACM badges 36	\@setauthorsaddresses: Introduced
v1.43	macro
\@startsection: Added	\ACM@linecount@bx: Rearranged the
\makeatletter 48	code to get rid of spurious
\country: Added comma before	underfull messages (Benjamin
country for journals 92	Byholm)
v1.44	\author: Started counting authors 69
General: Added package refcount 36	\authorsaddresses: Introduced
Deleted package cleveref 36	macro

\country: Corrected spacing for	v1.52
institution 92	\@copyrightowner: Rewording of
\if@ACM@acmthm: Modified	licenses 79
description	\@copyrightpermission: Another
\liningnums: Workaround for	rewording of copyright statements
compatibility with fontspec 56	for iw3c2w3[g] 80
\maketitle: Added authors' addresses 84	v1.53
Thankses go before authors'	General: Added PACMCGIT, TIOT,
addresses	TDSCI 60
\num@authors: Introduced macro 69	v1.54
v1.47	General: Added Ross's patch for
General: New journal: THRI 36	sectioning 107
v1.48	Deleted indent for subsubsection $. 107$
General: \citeyear no longer	XeTeX now uses T1 encoding 55
behaves like \citeyearpar 50	\@mkbibcitation: Bug corrected
Code prettying (Michael D. Adams) 36	(Ross Moore) 99
Initial support for Biblatex (Daniel	\@shortauthors: Added submission
Thomas)	id in anonymous mode 102
Misc entries in the bibliography no	\ACM@adddotafter: Added macro 107
longer produce a separate date 36	\ACM@NR@adjustedSectionformat:
Typos fixed (Jamie Davis) 36	Added macro 107
\@headfootfont: Deleted	\ACM@NRadjust: Added macro 106
unnecessary switch (Michael	\author: Added submission id in
D. Adams) 102	anonymous mode 69
\@mkabstract: Removed spurious	\if@ACM@nonacm: Added macro 38
indentation if abstract is followed	v1.55
by an empty line	General: Now we use purple color for
\ACM@timestamp: Fromatting change	links 49
(Michael D. Adams) 102	Table captions for SIGCHI now use
\if@ACM@review: Review mode now	the same font size as figure
switches on folios	captions (Luis Leiva) 57
	Typo corrected (Zack Weinberg) . 42
version info to pdfcreator tag 84	\@mkbibcitation: Bug corrected 99
Added language and doctitle attributes to PDF (Andreas	\maketitle: Fixes topnum 84
Reichinger)	v1.56
Suppressed empty DOI (Serguei	General: Looks like XeTeX requires
Mokhov) 84	explicit monotype font declaration 55
v1.50	Make two-column layouts flush
\@copyrightpermission: New	(Philip Quinn)
copyright statements for	\@marginfigure: Added checking for
iw3c2w3[g]	description
v1.51	\@mkteasers: Added check for
General: Corrected the bug with price	description
suppression	\acksname: Added macro (Philip
Suppress price if the copyright is	Quinn)
set to iw3c2w3 or iw3c2w3g 78	\ccsdesc@parse: End the concepts
XeTeX now uses OTF fonts	list with a period (Philip Quinn) . 77
(Joachim Breitner) 55	\Description: Added macro 56
firstpagestyle: We now use journal	\if@Description@present: Added
abbreviation for footers 105	macro
standardpagestyle: We now use	\if@undescribed@images: Added
journal abbreviation for footers . 102	macro

v1.57	v1.61
\ACM@origbaselinestretch: Added check whether the user changed	<pre>\@typeset@author@bx: Added \normalbaselines 95</pre>
\baselinestretch 115	v1.64
\author: Added warning if \author	\ACM@linecount@bx: Bug fix: made
has comma	the spacing on the left and the
\email: Added warning if \author	right size equal 101
has comma	\if@ACM@maketitle@typeset:
\if@ACM@balance: Added macro 38	Introduced macro 60
\vspace: Added warning 114	\maketitle: Added a switch setting to
v1.58	show that $\mbox{\mbox{\it maketitle}}$ is typeset . 84
General: Added HEALTH. TDSCI is	v1.65
renamed to TDS 60	\@mkauthorsaddresses: Deleted
Suppressed \addtocounter in pdf	cs@addpunct 98
subject	v1.66
\@dblfloat: Deleted spurious	General: Patching algorithm and
\vspace warning 58	algorithm* to prevent spurious
\@marginfigure: Deleted spurious	space warnings
\vspace warning 58	\@specialsection: Suppress
\@margintable: Deleted spurious	warnings about \vspace 88
\vspace warning 58	v1.67
\@mkbibcitation: Deleted spurious	General: Patching lstlisting and
\vspace warning99	lstlisting* to prevent spurious
\@printendtopmatter: Deleted	space warnings
	\@parfont: Deleted redefinitions of
spurious \vspace warning 100	sections
\@sidebar: Deleted spurious \vspace	\@specialsection: Paragraph inside
warning	group does not print its argument.
\maketitle: Original \vspace inside	Added a bugfix 88
\maketitle 84	v1.68
\vspace: Preserved old versions as	General: New command for unindent
\@vspace@orig and	paras
\@vspace@orig 114	\@specialsection: Deleted grouping
v1.59	altogether
\acmConference: Setting	v1.69
\@ACM@journal@bibstrip 68	General: No dots for unindented
\acmJournal: Setting	paragraphs 107
\@ACM@journal@bibstrip 68	\@printendtopmatter: Deleted
\if@ACM@journal@bibstrip:	grouping 100
Introduced macro 40	\@specialsection: Changed dot to
firstpagestyle: Added logic for	colon for sigplan
conference papers using journal	\ACM@linecountR: Do not increase
format	numbers in one column format . 101
Moved page styles to	\ccsdesc@parse: Use math right
\AtBeginDocument 105	arrow in text
standardpagestyle: Added logic for	v1.71
conference papers using journal	
format	\lesubsubsection: Bug fixed (thanks
Moved page styles to	to Andrew Black) 48
\AtBeginDocument 102	
-	\author: Added \detokenize
v1.60	(Kuldeep S. Meel)
\@headfootfont: Moved to	\maketitle: Do not andify authors
TOOTHOTESIZE 107	tor not metadata (Noott Pakin) X/

v1.78	
\@mkauthors@i: Unboxing	
	95
	96
\@mkteasers: Unboxing \mktitle@bx	99
	88
	88
	83
. =	
	11
	99
	77
	91
	-
\translatedtitle and	
\translatedsubtitle	91
\@mktitle@iv: Added	
\translatedtitle and	
\translatedsubtitle	91
\@mktranslatedabstract: Added	
macro	99
-	
	71
	46
	16
	40
	46
	45
	45
•	39
	84
translatedabstract: Added macro	46
\translatedkeywords: Added macro	46
\translatedsubtitle: Added macro	46
\translatedtitle: Added macro	46
v1.85	
General: Added CC licenses	78
\@acmengagemetadata: Introduced	
	84
	79
	0.0
	80
	100
	\@mkauthors@i: Unboxing \mktitle@bx \@mkauthors@iii: Unboxing \mktitle@bx \@mkteasers: Unboxing \mktitle@bx \@printtopmatter: Added processing the overflowing title box \@specialsection: Again suppressed \vspace warning v1.82 \anon: Introduced macro v1.83 General: Use babel for multilanguage papers \@mkabstract: I13n \@mktitle@i: Added \translatedtitle and \translatedsubtitle \@mktitle@ii: Added \translatedsubtitle \@mktitle@ii: Added \translatedsubtitle \@mktitle@iv: Added \translatedsubtitle \@mktranslatedsubtitle \@mktranslatedsubtitle \@mktranslatedsubtitle \@mktranslatedsubtitle \@mktranslatedsubtitle \@mktranslatedsubtitle \@mktranslatedsubtitle \@mktranslatedsubtitle \@mktranslatedbstract: Added macro \@translatedabstracts: Added macro \@translateddbstracts: Added macro \\@translatedsubtitle: Added macro \ACM@lang@check: Added macro \ACM@languages: Introduced macro \maketitle: I13n translateddbstract: Added macro \translatedsubtitle: A

\maketitle: acmengage 84	\@acmBadgeR: Introduced macro 73
\setcctype: Added macro 79	\@mktitle@i: Moved badges to top
\setengagemetadata: Introduced	header 91
macro 84	Moved up acmcp title 91
v1.86	\@mktitle@iii: Moved badges to top
\country: Error if country is empty . 92	header 91
standardpagestyle: Special	\acmBadge: Added macro 74
treatment of ACM Engage	\acmBadgeL: Redefined macro 74
materials 102	\acmBadgeR: Redefined macro 73
v1.87	\if@ACM@badge: Deleted macro 73
General: Added 'framed' package for	firstpagestyle: Moved badges here 105
acmcp	\set@ACM@acmcpbox: Added logo 87
No numbering sections for ACMCP 109	Added zref position of the bottom 87
\@ACM@color@frame: Introduced	v1.91
macro	\acmContributions: Restored the
\@ACM@copyright@check@cc: Added	macro
macro	standardpagestyle: Redesigned
\@copyrightpermission: CC licenses	ACMP labels 102
now are allowed only for non-acm	v1.93
or ACM engage publications 80	General: Added PACMSE journal
\@mkauthors@i: Special treatment for	option
acmcp	v2.00
\@mktitle@i: Special treatment for	General: Deleted acmPrice 78
acmcp	\@ACM@copyright@check@cc: Moved
\acmArticleType: Introduced macro 76	to warning
\acmCodeDataLink: Added possibility	\@copyrightowner: Changed wording 79
to have several links	\@copyrightpermission: Rewrote
Introduced macro	wording 80
\acmDataLink: Introduced macro 77	\@folio@ht: Obsoleted macro 105
Now this is the same as the code link 77	\@folio@max: Obsoleted macro 105
\if@ACM@acmcp: Introduced macro 40	\@folio@voffset: Obsoleted macro . 105
firstpagestyle: Special treatment	\@folio@wd: Obsoleted macro 105
for acmcp	\@folioblob: Obsoleted macro 105
	\acmPrice: Deleted macro 73
for non-acm publications 84	firstpagestyle: Deleted blobs 105
\set@ACM@acmcpbox: Added macro . 87	\maketitle: Added "ACM" for papers 84
standardpagestyle: Special treatment of ACMCP 102	Deleted acmPrice 84
treatment of ACMCP 102 v1.88	v2.01
\@mktitle@i: Moved down title for	General: Documentation update:
	POMACS uses acmsmall 36
acmcp	\acmBooktitle: Moved default
General: Added 'zref-savepos' package	conference title to conference
for acmcp 42	setting
\@ACM@acmcp@delta: Added dimen . 42	\acmPrice: Now the macro produces
\@ACM@badge@skip: Redefined macro 73	a warning
\@ACM@color@frame: Added saving	v2.02
the position of the bottom 76	\acmConference: Moved here setting
\@acmBadgeL: Introduced macro	the conference title for bibstrip 68
(Cacimbadget, introduced macro /3	are conference title for bibotilp 00

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
                               \@ACM@instpresentfalse
                                                              \@M . 479, 518, 536, 545, 3463
                                      . . . . . . . . . . . . . . . 2589
                                                              \@abstract 1685, 2790, 2797
    . . . . . . . . . . . . 613
   . . . 1888, 1891, 1903,
                               \@ACM@instpresenttrue
                                                              \@acmArticle 1616, 1619,
       1908, 1913, 2013, 2050
                                      . . . 2492, 2503, 2583
                                                                      2202, 2815, 2816,
                               \@ACM@journal@bibstripfalse
                                                                      2944, 2947, 2967,
\@@authornotemark ..
                                      . . . . . . . . . 232, 1462
                                                                      2977, 2988, 3056,
       . . . . . . . . 1610, <u>2776</u>
\@@par .... 479, 536
                               \@ACM@journal@bibstriptrue
                                                                      3079, 3089, 3099, 3136
\@ACM@acmcp@delta ..
                                       . . . . . . . . 230, 1448
                                                              \@acmArticlePage ...
                               \@ACM@journalfalse .
                                                                       2943, 2961, 2962,
       .... <u>277</u>, 2278, 2282
                                                                      2971, 2974, 2981, 2985
                                       ....... 211,
\@ACM@acmcpbox ....
                                      213, 215, 217, 219, 222
                                                              \@acmArticleSeq . . . . 1618
       2265, 2269, 3052, 3132
                               \@ACM@journaltrue ..
                                                              \@acmBadgeL .....
\@ACM@acmcpfalse ... 169
                                       203, 205, 207, 209, 225
                                                                       1642, 1657, 1658,
\@ACM@acmcptrue .... 226
                               \@ACM@labelwidth 1004,
                                                                      1663, 3070, 3082,
\@ACM@addtoaddress .
                                      1007, 1015, 1020, 1046
                                                                      3083, 3094, 3095,
        2480, 2508, 2509, 2511
                               \@ACM@maketitle@typesetfalse
                                                                      3102, 3105, 3110, 3131
\@ACM@authorsperrow
                                                              \@acmBadgeR .....
                                      . . . . . . . . . . . . 1053
       \@ACM@maketitle@typesettrue
                                                                       1641, 1644, 1645,
       2655, 2656, 2708, 2709
                                      . . . . . . . . . . . . 2114
                                                                      1650, 3071, 3084,
\@ACM@badge@skip ...
                               \@ACM@manuscriptfalse 198
                                                                      3085, 3092, 3093,
       ... <u>1639</u>, 1651, 1664
                                                                      3103, 3106, 3111, 3132
                               \@ACM@manuscripttrue 196
\@ACM@badge@width ..
                                                              \@acmBooktitle . 1463,
                               \@ACM@newfontsfalse
       ..... <u>1636</u>,
                                      . . . . . . 834, 837, 840
                                                                      1473, 2171, 2192, 2831
       1648, 1654, 1661, 1667
                               \@ACM@newfontstrue . 831
                                                              \@acmCodeDataLink ..
\@ACM@balancefalse .
                               \@ACM@printacmreffalse
                                                                      . . . . 1778, 1779,
       . . . . 3365, 3389,
                                      . . . . . . . . . . . 95, 227
                                                                      1781, 1783, 2285, 2286
       3391, 3393, 3405, 3409
                               \@ACM@printfoliostrue 78
                                                              \@acmContributions .
\@ACM@checkaffil 2236,
                                                                      . . . 1784, 2291, 2292
                               \@ACM@resetaffil ...
       <u>2593</u>, 2624, 2629,
                                        2588, 2623, 2628,
                                                              \@acmDOI . . 1634, 2194,
       2691, 2696, 2736, 2741
                                                                      2197, 2203, 2206,
                                      2690, 2695, 2735, 2740
\@ACM@citypresentfalse
                               \@ACM@reviewtrue ... 140
                                                                      2839, 3000, 3002,
       . . . . . . . . . . . . . . 2590
                               \@ACM@screentrue ...
                                                                      3024, 3026, 3057, 3137
\@ACM@citypresenttrue
                                       . . . . 1172, 1216,
                                                              \@acmEditors <u>1476</u>, <u>1477</u>,
       . . . 2494, 2508, 2585
                                      1222, 1236, 1242, 1248
                                                                      1478, 1481, 2832, 2833
\@ACM@color@frame ..
                                                              \@acmISBN . . . . . 1632, 2205
                               \@ACM@sigchiamodefalse
       ..... <u>1771</u>, 2262
                                                              \@acmMonth 1622, 1624, 2202
                                      . . . . . . . . . . . . . . 200
\@ACM@commabox ....
                               \@ACM@sigchiamodetrue 220
                                                              \@acmNumber .....
       . . . 2480, 2484, 2485
                                                                       1614, 2828, 2967,
                               \@ACM@timestamptrue
\@ACM@copyright@check@cc
                                                                      2977, 2988, 3055,
                               \@ACM@title@width ..
       . . . . . . . 1924, 2068
                                                                      3079, 3089, 3099, 3135
                                       . . . . . . . . 1638,
\@ACM@countrypresentfalse
                                      2453, 2455, 2464, 2465
                                                              \@acmPubDate .....
       . . . . . . . . . . . . . . 2591
                               \@DeclareACMFormat 38,
                                                                       1624, 2828, 2967,
\@ACM@countrypresenttrue
                                                                      2977, 2988, 3057,
                                      39, 40, 41, 42, 43,
       . . . 2499, 2511, 2587
                                                                      3080, 3090, 3100, 3137
                                      44, 45, 46, 47, 48, 49
\@ACM@engagefalse .. 167
                               \@Description@presentfalse \@acmSubmissionID ..
\@ACM@engagetrue ... 223
                                      . . 876, 879, 954, 2782
                                                                      1503, 1522, 1523.
\@ACM@institution@separator\@Description@presenttrue
       2758, 2759, 2764
                                      . . . . . . . . . . 870, 873
                                                                      1630, 2924, 2925, 2935
```

\@acmVolume	\@authorfont <u>2541</u> , 2546,	\@currentaffiliation
1612, 2828, 2966,	2550, 2553, 2556,	2648, 2651, 2673,
2976, 2987, 3055,	2559, 2562, 2565,	2680, 2681, 2684,
3078, 3088, 3098, 3135	2568, 2571, 2611, 2647	2687, 2688, 2693,
\@acmYear 1620, 1627,	\@authornotemark	2720, 2727, 2728,
2087, 2171, 2202, 2819	1602, 1608, 2775	2730, 2732, 2733, 2738
\@acmdefinitionbodyfont	\@authornotes	\@currentaffiliations
3276, 3288, 3302	1599, 1603, 2134	2577,
\@acmdefinitionheadfont	\@authorsaddresses .	2578, 2579, 2581,
3278, 3290, 3304		2607, 2619, 2620, 2626
	1574,	\@currentauthors
\@acmdefinitionindent	2143, 2294, 2770, 2849	2575, 2576,
3277, 3289, 3303	\@auxout 649, 2281	2606, 2610, 2611,
\@acmdefinitionnotefont	\@begindocumenthook 645	2613, 2647, 2650,
<u>3279</u> , 3291, 3307	\@beginmaketitlehook	
\@acmengagemetadata	2104, 2107, 2113	2672, 2674, 2675,
<u>2108</u> , 2110, 2852	\@botnum 2255	2677, 2719, 2721,
\@acmownedfalse	\@citestyle 311	2722, 2724, 2775, 2776
1839, 1842,	\@classname 24,	\@currentlabel . 563,577
1845, 1850, 1853,	26, 35, 53, 55, 56,	\@dblarg 465
1856, 1859, 1862,		\@dblfloat <u>966</u>
1868, 1871, 1874, 1877	61, 63, 64, 69, 71,	\@department 1552, 1553
\@acmownedtrue	72, 77, 80, 81, 86,	\@dotsep <u>3243</u>
1826, 1835, 1865	88, 89, 94, 100,	\@editorsAbbrev
\@acmplainbodyfont .	101, 105, 109,	<u>1475</u> , 1480, 2833
3244, 3256, 3270	114, 116, 117, 122,	\@empty 155,
\@acmplainheadfont .	124, 125, 130, 132,	234, 381, 421, 469,
•	133, 138, 142, 143,	1459, 1463, 1477,
3246, 3258, 3272	161, 171, 177, 183,	1499, 1502, 1520,
\@acmplainindent	260, 422, 446, 832,	1522, 1527, 1528,
<u>3245</u> , 3257, 3271	835, 838, 875, 884,	1534, 1644, 1657,
\@acmplainnotefont .	887, 957, 1173,	1675, 1676, 1732,
$\dots \underline{3247}, 3259, 3275$	1217, 1223, 1237,	1733, 1739, 1746,
\@adddotafter	1243, 1249, 1443,	1778, 1789, 1815,
3151, 3152, 3154,	1445, 1492, 1547,	2105, 2138, 2143,
3166, 3181, 3185, <u>3238</u>	1561, 1628, 1672,	2194, 2205, 2206,
\@additionalaffiliation	1678, 1683, 1690,	2217, 2220, 2226,
1548, <u>1549</u>	1692, 1693, 1696,	2230, 2285, 2288,
\@addpunct . 2762, 2848,	1698, 1699, 1702,	2291, 2294, 2329,
2849, 3238, 3239, 3359	1710, 1712, 1713,	2458, 2467, 2476,
\@addspaceafter 3239	1715, 1716, 1764,	2498, 2577, 2610,
\@affiliationfont	1817, 1926, 1930,	2618, 2619, 2674,
2542, 2547,	1933, 2595, 2598,	2680, 2687, 2721,
2551, 2554, 2557,	2601, 2771, 2785,	
2560, 2563, 2566,	2812, 3467, 3470, 3477	2727, 2732, 2770,
2569, 2572, 2624, 2647	\@clubpenalty 524	2778, 2815, 2820,
	\@concepts . 1789, 1801,	2832, 2839, 2924,
\@afterheading . 510, 2258	1815, 2220, 2222, 2240	2935, 3000, 3002,
\@afterindentfalse .		3024, 3026, 3056,
	\@copyrightowner	3057, 3136, 3137,
\@afterindenttrue 454		3247, 3279, 3428, 3445
\@article@string	\@copyrightpermission	\@endfloatbox 969
2815, 2828, 2836	<u>1940</u> , 2154, 2166	\@endpefalse 3361
\@author	\@copyrightyear	\@endwidefloatbox 969, 977
1501, 1507, 1514,	2086, 2178, 2180	\@finalstrut 568,581
2609, 2674, 2721, 2765	\@currbox 983, 984, 985	\@float 971

```
1151, 1155, 1160,
                                                                    2228, 2241, 2288, 2289
\@flushglue ..... 3195
                                     1164, 1168, 1175,
\@fnsymbol .... 2124
                                                             \@latex@error .... 355
                                     1179, 1183, 1187,
                                                             \@lempty .... <u>1687</u>, 2790
\@folio@ht .... 3062
                                                             \@listI ..... 1028, 1032
                                     1192, 1196, 1200,
\@folio@max ..... <u>3062</u>
\ensuremath{\mbox{\sc 0}} \@folio@voffset .... \frac{3062}{}
                                     1204, 1209, 1213,
                                                             \@listi ..... 1025, 1032
                                     1219, 1225, 1229,
                                                             \@listii ..... <u>1033</u>
\@folio@wd ..... <u>3062</u>
                                     1233, 1239, 1245,
                                                             \@listiii ..... 1036
\@folioblob .... 3062
                                     1251, 1255, 1259,
\@footnotemark . 584, 2122
                                                             \@listiv ..... <u>1038</u>
                                     1264, 1268, 1272,
\@footnotemark@nolink
                                                             \@listv ..... 1040
                                     1276, 1280, 1284,
       . . . . . . . . 584, 2122
                                                             \@listvi ..... <u>1042</u>
                                     1288, 1292, 1296,
\@footnotetext ....
                                                             \@m .... 467
                                     1300, 1304, 1308,
       . . . . . 559, 585, 2123
                                                             \@makefnmark ... 558,
                                     1312, 1316, 1320,
\@footnotetext@nolink
                                                                    <u>583</u>, 2126, 2131, 2135
                                     1324, 1328, 1332,
       . . . . . . . . 585, 2123
                                                             \@makefntext .....
                                     1336, 1340, 1344,
\@for ..... 287
                                                                    . . <u>558</u>, 567, 580, 2137
                                     1348, 1352, 1356,
\@formatdoi . . . . 1923,
                                                             \ensuremath{\verb{Qmarginfigure}} . 949, 950
                                     1360, 1364, 1369,
       2197, 2203, 2206,
                                                             \@margintable .. 960, 961
                                     1374, 1378, 1382,
       2839, 3000, 3002,
                                                             \@minipagefalse . 792,979
                                     1387, 1391, 1395,
       3024, 3026, 3057, 3137
                                                             \@minus 3171, 3175, 3179,
                                     1399, 1403, 1407,
\@fps .... 970
                                                                    3183, 3187, 3192,
                                     1411, 1415, 1419,
\@fpsadddefault .... 970
                                                                    3267, 3269, 3299, 3301
                                     1423, 1427, 1431,
                                                             \@mkabstract . . 2216, 2789
\@gobble ..... 309, 353
                                     1435, 1439, 1450,
\@hangfrom .... 478, 535
                                                             \@mkauthors 2127, 2129, 2513
                                     1451,\ 2190,\ 3055,\ 3135
                                                             \@mkauthors@i .....
\@headfootfont ....
                              \@journalNameShort .
       .... <u>2937</u>, 2961,
                                                                    .... 2517, 2519,
       2962, 2963, 2964,
                                      . . . . 1132, 1136,
                                                                    2521, 2523, 2537, 2605
       2970, 2973, 2980,
                                     1140, 1144, 1148,
                                                             \@mkauthors@ii .... <u>2640</u>
       2984, 2992, 2993,
                                     1152, 1156, 1161,
                                                             \@mkauthors@iii ....
       2999, 3001, 3005,
                                     1165, 1170, 1176,
                                                                    .... 2525, 2527,
       3008, 3016, 3017,
                                     1180, 1184, 1188,
                                                                    2529, 2531, 2535, 2652
                                     1193, 1197, 1201,
                                                             \@mkauthors@iv 2533, 2705
       3023, 3025, 3029, 3032
\@idxitem .... 3460
                                     1205, 1210, 1214,
                                                             \@mkauthorsaddresses
                                     1220, 1226, 1230,
\@ifnextchar ..... 1552
                                                                    . . . . . . . . 1575, <u>2749</u>
                                     1234, 1240, 1246,
\@ifnotempty .... 2092
                                                             \@mkbibcitation 2251, 2806
                                     1252, 1256, 1260,
\@ifnum ..... 325, 327
                                                             \@mkteasers ... 2127, 2777
\@ifstar ..... 463
                                     1265, 1269, 1273,
                                                             \@mktitle .... 2127, <u>2373</u>
\@ifundefined .....
                                     1277, 1281, 1285,
                                                             \@mktitle@i 2376, 2378,
                                     1289, 1293, 1297,
        3312, 3315, 3318,
                                                                    2380, 2382, 2396, 2449
                                     1301, 1305, 1309,
                                                             \@mktitle@ii ..... <u>2462</u>
       3321, 3324, 3328, 3331
                                     1313, 1317, 1321,
\@iiiparbox ..... 795
                                                             \@mktitle@iii .....
                                     1325, 1329, 1333,
\@indextitlestyle .. 3459
                                                                    .... 2384, 2386,
                                     1337, 1341, 1345,
                                                                    2388, 2390, 2394, 2462
\@input ..... 547
                                     1349, 1353, 1357,
\@insideauthorgroupfalse
                                                             \@mktitle@iv .. 2392, 2472
                                     1361, 1365, 1370,
       . . . . . . . . 1490, 1542
                                                             \@mktranslatedabstract
                                     1375, 1379, 1383,
\@insideauthorgrouptrue
                                                                    . . . . . . . . . 444, 2799
                                     1388, 1392, 1396,
       . . . . . . . . . . . 1497
                                                             \@mktranslatedkeywords
                                     1400, 1404, 1408,
\@journalCode .. 1054,
                                                                    . . . . . . . . . 441, 1576
                                     1412, 1416, 1420,
       1173, 1217, 1223,
                                                             \@mpargs ..... 795
                                     1424, 1428, 1432,
       1237, 1243, 1249, 1443
                                                             \@mparswitchfalse .. 741
                                     1436, 1440, 1451,
\@journalCode@nr ...
                                                             \@mpfootins .....
                                     2827, 2966, 2976,
       . . . 1054, 1129, 1449
                                                                    572, 573, 787, 788, 790
                                     2987, 3078, 3088, 3098
\@journalName ....
                                                             \@mpfootnotetext ... 571
       . . . . 1131, 1135,
                              \@keywords . . . . 1674,
                                                             \@ne . 313, 317, 321, 323,
       1139, 1143, 1147,
                                     1675, 1676, 2226,
                                                                    635, 2866, 2872, 2876
```

\0.:1	10	\ O(1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
\@nil 332	\@printpermissiontrue	\@teaserfigures
\@nobreakfalse . 512,552	1824, 1833, 1848	<u>2088,</u> 2090, 2778, 2783
\@noskipsecfalse 516	\@printtopmatter	\@tempa 287,
\@noskipsectrue 513	2128, <u>2328</u>	288, 290, 292, 294,
\@pages@word	\@proofindent	296, 298, 300, 302,
2809, 2829, 2836	<u>3338</u> , 3348, 3358	304, 306, 308, 310,
\@par 2140, 2147	\@proofnamefont	312, 314, 316, 318,
\@parboxrestore 576	<u>3337</u> , 3347, 3359	320, 322, 324, 326,
	\@received . <u>1730</u> , <u>1733</u> ,	328, 330, 332, 335,
\@parfont	1734, 1736, 1739,	337, 339, 341, 343,
3185, 3189, 3194, <u>3199</u>	1740, 1742, 1746, 1747	345, 1526, 1527,
\@permissionCodeOne	\@restonecolfalse 3457	1731, 1732, 2497,
1133, 1137,	\@restonecoltrue 3457	2498, 2618, 3428,
1141, 1145, 1149,	\@rightskip 3195,3196	3444, 3445, 3447, 3451
1153, 1157, 1162,	\@saveabstract 1681, <u>1682</u>	\@tempb
1166, 1171, 1177,	\@saveteaser 2089, 2090	288, 290, 292, 294,
1181, 1185, 1189,	\@savetranslatedabstract	296, 298, 300, 302,
1194, 1198, 1202,	444, 445	304, 306, 308, 310,
1206, 1211, 1215,	\@seccntformat . $472, \overline{529}$	312, 314, 316, 318,
1221, 1227, 1231,	\@secfont 3173, 3199	320, 322, 324, 326,
1235, 1241, 1247,	\@secpenalty 461	328, 330, 335, 337,
1253, 1257, 1261,	\@sect 465, 466	339, 341, 343, 345,
1266, 1270, 1274,	\@setaddresses 2774	3446, 3447, 3450, 3451
1278, 1282, 1286,	\@setauthorsaddresses	\@tempboxa . 795, 2338, 2340
1290, 1294, 1298,	2147, 2294, 2849	\@tempc . 333, 334, 336,
1302, 1306, 1310,	\@setengagemetadata	338, 340, 342, 344, 346
1314, 1318, 1322,	2111, 2851	\@tempdima
1326, 1330, 1334,	\@setthanks 2140, 2848	2276, 2279, 2280,
1338, 1342, 1346,	\@shortauthors	2282, 2334, 2335,
1350, 1354, 1358,	2932, 2955, 2963,	2336, 2342, 2343, 2344
1362, 1366, 1371,		\@tempskipa
1376, 1380, 1384,	2971, 2981, 2993, 3017 \@sidebar 945, 946	453, 455, 456, 461,
1389, 1393, 1397,		474, 475, 506, 507,
1401, 1405, 1409,	\@specialsection	509, 521, 522, 531, 532
1413, 1417, 1421,	1578, 2221, 2227, 2298	\@textbottom 796
1425, 1429, 1433,	\@ssect 464, 530	
1437, 1441, 1452, 2202	\@startPage 1670,	\@textsuperscript
\@permissionCodeTwo	2329, 2330, 2332, 2929	583, 2126, 2131
1158,	\@startsection . 450,	\@texttop 797
1190, 1207, 1262,	<u>542</u> , 3170, 3174,	\@thefnmark . 564, 578,
1367, 1372, 1385, 1453	3178, 3182, 3186, 3191	583, 2126, 2131, 2136
	\@starttoc 542	\@title 1582, 2239,
\@plus 545, 553,	\@subparfont 3224	2457, 2466, 2475, 2819
796, 3171, 3175,	\@subsecfont 3177, <u>3199</u>	\@titlefont <u>2399</u> , 2454,
3179, 3183, 3187,	\@subsubsecfont 3181, 3199	2456, 2463, 2465, 2473
3192, 3266, 3268,	\@subtitle . 1483, 1591,	\@titlenotes
3298, 3300, 3356, 3461	2458, 2459, 2467,	<u>1580</u> , 1584, 1587, 2132
\@printcopyrightfalse	2468, 2476, 2477, 2820	\@tochangmeasure 483,496
1838, 1849	\@subtitlefont	\@toclevel 467
\@printcopyrighttrue	<u>2424,</u> 2459, 2468, 2477	\@tocline 555, 556, 557
1822, 1834	\@subtitlenotes	\@topnum 2253
\@printendtopmatter	<u>1589</u> , 1593, 1596, 2133	\@translatedabstracts
2256, <u>2841</u>	\@svsec . 469, 472, 478, 493	. 442, 449, 2217, 2218
\@printpermissionfalse	\@svsechd 491, 519, 539	\@translatedkeywords
	\@teaser 2090, 2779	. 439, 441, 2230, 2231
	•	_ , ,

\@translatedsubtitle	2205, 2286, 2811,	\ACM@lang@check
436,	2819, 2871, 3057, 3137	420, 434, 437, 440, 448
438, 2459, 2468, 2477	\{ 295	\ACM@languages
\@translatedtitle 433,	\} 295	153, 381, 383, 421
435, 2457, 2466, 2475	\ 1466, 1797,	\ACM@linecount
\@typeset@author@bx	1807, 2178, 2180,	2865, 2866,
2644,	2815, 2816, 2834, 2929	2871, 2872, 2875, 2876
2698, 2704, 2743, 2748		\ACM@linecount@bx
\@typeset@author@line	Α	2862, 2882, 2912
2574, 2608, 2632, 2637	\abstract <u>1681</u>	\ACM@linecount@bxht
\@typesetengagemetadata	abstract (env.) 18	2864, 2870, 2873, 2874
2214, <u>2850</u>	\abstractname 379,	\ACM@linecountL
\@undefined 645, 863, 2104	392, 2791, 2795, 2803	2878, 2953,
\@undescribed@imagesfalse	\acks 3419	2956, 2961, 2964,
	acks (env.)	2970, 2972, 2980,
\@undescribed@imagestrue	\acksname 390, 401, 409,	2982, 2992, 2995,
883, 886, 956, 2784	417, 3418, 3421, 3422	2999, 3005, 3016,
\@vspace 877, 880, 888,	\ACM@adddotafter	3019, 3023, 3029,
890, 892, 894, 896,		3051, 3070, 3082,
898, 900, 902, 904,	\ACM@ArticleType	3083, 3094, 3095,
906, 946, 951, 961,	1749, 3050, 3130	3102, 3105, 3110, 3131
967, 2120, 2299,	\ACM@ArticleType@nr	\ACM@linecountR . 2885,
2325, 2807, 2842,		2983, 2985, 2993,
2845, 3465, 3467, 3473	1749, 1751, 3048, 3128	2996, 3003, 3010,
\@vspace@acm	\ACM@cc@type 1883,	3017, 3020, 3027,
2325, 2845, 3473	2069, 2071, 2072,	3034, 3103, 3106, 3111
\@vspace@orig 877, 880,	2075, 2076, 2077,	\ACM@mk@linecount
	2078, 2079, 2080, 2081	2867, 2880,
888, 890, 892, 894,	\ACM@CC@Url	2895, 2897, 2899,
896, 898, 900, 902,	2070, 2071, 2072, 2073	2901, 2903, 2905, 2907
904, 906, 946, 951,	\ACM@cc@version	\ACM@NR@adjustedSectionformat
961, 967, 2120,	1882, 2071, 2082	3149, 3158
2299, 2807, 2842, 3465	\acm@copyrightinput 1828	\ACM@NRadjust
\@vspacer 878, 881, 889,	\acm@copyrightmode .	3140, 3173, 3177,
891, 893, 895, 897,		3181, 3185, 3189, 3194
899, 901, 903, 905,	1836, 1841, 1844,	\ACM@origbaselinestretch
907, 947, 952, 962,	1847, 1852, 1855,	
968, 2121, 2300,	1858, 1861, 1864,	· · · · · · · · · · · · · · · · · · ·
2326, 2808, 2843,	1867, 1870, 1873,	\ACM@ps@headings 2856, 2860
2846, 3466, 3470, 3474	1876, 1886, 1941, 2153	-
\@vspacer@acm	\ACM@fontsize <u>146, 234,</u>	\ACM@ps@myheadings .
2326, 2846, 3474	237, 239, 241, 243,	2855, 2859
\@vspacer@orig . 878,	245, 247, 249, 251,	\ACM@ps@plain . 2854, 2858
881, 889, 891, 893,	253, 255, 257, 260, 261	\ACM@restore@pagestyle
895, 897, 899,	\ACM@format 32, 161	
901, 903, 905,	\ACM@format@nr 32,	\ACM@sect@format
907, 947, 952,	161, 170, 176, 182,	3159, 3161
962, 968, 2121,	195, 201, 235, 596,	\ACM@sect@format@
2300, 2808, 2843, 3466	681, 760, 798,	3148, 3161, 3163
\@width 776, 783	918, 987, 2301,	\ACM@sect@format@null
\@xp 549, 550	2348, 2374, 2400,	3162, 3163
\@xsect 504, 505, 541	2425, 2515, 2543,	\ACM@timestamp
\\ 666, 675, 1502,	2887, 2951, 3068,	<u>2915</u> , 3042, 3116, 3121
1781, 2072, 2178,	3115, 3204, 3248,	\acmArticle 14, 1616
2183, 2198, 2202,	3280, 3339, 3366, 3387	\acmArticleSeq . 15, 1618

2335, 2343, 2451,	\balance 3416	\captionsenglish 384
1494, 1496, 1774,	В	468, 482, 486, 495, 499
1039, 1041, 1043,	·	\c@secnumdepth
1029, 1034, 1037,	\authorsaddresses 14, 1574	\c@footnote 2124
\advance	2234, 2246, 2248, 2819	C
\addvspace 461, 553	1504, 1509, 1516,	
1015, 1019, 1020, 2873	\authors	2370, 2649, 3052, 3132
\addtolength 1013, 1014,	\authornotemark . 14, 1606	2364, 2366, 2368,
\addto 384, 395, 403, 411 \addtocounter 589, 1809	. 14, 1548, 1600, 2814	2358, 2360, 2362,
2637, 2704, 2748, 2767	\authornote	2352, 2354, 2356,
1602, 1608, 1610,	2707, 2709, 2715, 2718	\box 984, 2350,
1513, 1544, 1564,	2668, 2671, 2706,	2704, 2748, 2779, 2844
1499, 1501, 1506,	2662, 2664, 2666,	2461, 2471, 2479,
\addresses	2653, 2654, 2656,	2285, 2286, 2288, 2291, 2294, 2366,
\addpenalty 461	\author@bx@wd 2641, 2644,	• .
	2654, 2671, 2707, 2718	\bigskip 1747,
\additionalaffiliation	<u>2642,</u> 2649,	\bibstyle@acmnumeric 365
485, 498, 2791, 3422	\author@bx@sep	
\addcontentsline 283,	\author@bx <u>2640</u> , 2646, 2649	\bibstyle@acmauthoryear
\acmYear 14, 1620	1491, 2116, 2117, 2813	\bibstyle 309, 311, 353, 649
\acmVolume 14, 1612	\author 10,	\bibsection 281
\acmSubmissionID 15 , 1630	864, 3309, 3363, 3429	\bibliographystyle . 644
\acmPrice <u>1628</u>	\AtEndPreamble . 611,	\bibliofont 285
\acmplain <u>3265</u>	\AtEndEnvironment 882, 885	\bibfont 285
\acmNumber 14, <u>1614</u>	2261, 2769, 3413, 3476	2779, 2789, 2806, 2818
\acmMonth 14, <u>1622</u>		2684, 2745, 2754,
\acmJournal 9, <u>1447</u>	874, 1676, 1700, 1745, 1815,	2267, 2644, 2681,
\acmISBN		1576, 2220, 2226,
	\AtEndDocument	961, 967, 1549,
\acmDOI <u>3297</u>	\AtBeginMaketitle 32, 2107	\bgroup . 449, 946, 950,
\acmdefinition $\frac{20}{1786}$	898, 900, 902, 904, 906	3234, 3235, 3258, 3290
\acmDataLink 20, 1786	890, 892, 894, 896,	3228, 3231, 3232,
\acmContributions 1784	876, 879, 888,	3222, 3223, 3227,
3007, 3010, 3031, 3034	\AtBeginEnvironment	3218, 3220, 3221,
1458, 2173,	2861, 2938, 3062, 3164	3214, 3215, 3217,
\acmConference@venue	78, 95, 227, 638, 646, 1005,	2817, 3199, 3200,
1465, 1466, 2173, 3006, 3009, 3030, 3033	\AtBeginDocument	242, 2562, 2565,
1455, 1459, 1460,		2416, 2418, 2420,
\acmConference@shortname	anonsuppress (env.) 24 \apptocmd 3467, 3470	2402, 2404, 2406, 2410, 2412, 2414,
1456, 1464, 1465	\anon	\bfseries 1044, 2160, 2402, 2404, 2406,
\acmConference@name	2247, 2575, 2578, 2833	2119, 2513, 3141, 3420
3007, 3010, 3031, 3034	\andify 2246,	519, 533, 542, 634,
1457, 2173,	2726, 2743, 2748, 2764	\begingroup 476,
\acmConference@date	2679, 2698, 2704,	\begin 19, 2881, 2911
\acmConference 9 , 1454	2626, 2632, 2645,	3475, 3476, 3478
\acmCodeLink 20, 1777, 1786	2608, 2613, 2615,	\baselinestretch
\acmCodeDataLink <u>1777</u>	1516, 1531, 1537,	3298, 3299, 3300, 3301
\acmBooktitle <i>9</i> , 1464, <u>1473</u>	\and 1481, 1514,	3267, 3268, 3269,
\acmBadgeR <u>1643</u> , 1669	<u>1541</u> , 2617, 2687, 2732	3183, 3187, 3266,
\acmBadgeL <u>1656</u>	\affiliation 10,	3175, 3176, 3179,
\acmBadge 15, <u>1669</u>	2707, 2718, 2872, 2876	2873, 3171, 3172,
\acmArticleType . 20, 1749	2634, 2654, 2671,	\baselineskip 2164,

```
314, 315, 316, 317,
\captionsetup .. 910,
                              \CodelineIndex .... 16
       912, 914, 916, 925,
                                                                     318, 319, 320, 321,
                              \Collect@Body 443, 945,
                                      949, 960, 1681, 2089
       927, 930, 932, 935,
                                                                     322, 324, 326, 328,
                              \color .... 2100, 2162,
       937, 947, 953, 962, 2780
                                                                     330, 331, 335, 337,
                                      2871, 2875, 3049, 3129
                                                                     339, 341, 343, 345,
\captionsfrench . . . . 395
                                                                     433, 436, 439, 442,
\captionsgerman . . . .
                              \color@begingroup 566, 579
                                                                     445, 450, 466, 491,
\captionsspanish ... 411
                              \color@endbox .... 982
\ccdesc@parse@finish 1820
                                                                     505, 529, 530, 539,
                              \color@endgroup . . . .
                                                                     542, 555, 556, 557,
\ccsdesc . . . . . . 16, 1791
                                      . . . . . . . 569, 582, 793
                                                                     558, 560, 571, 583,
\ccsdesc@parse 1792, 1793
                              \colorbox . 1773, 3049, 3129
                                                                     589, 590, 591, 592,
\ccsdesc@parse@end .
                               \colorlet . . . . . 1753,
                                                                     593, 613, 644, 775,
       . . . . . . . . 1792, 1820
                                      1755, 1757, 1759, 1761
                                                                     782, 784, 796, 946,
\ccsdesc@parse@finish
                              \columnsep .... 3458
                                                                     950, 961, 967, 970,
       . . . . . . . . 1814, 1820
                              \columnseprule .... 3458
                                                                     974, 977, 995, 996,
CCSXML (env.) . . . . . . . . . 16
                              \columnwidth ... 575,
                                                                     997, 998, 1028,
\centering . . 546, 579,
                                      776, 968, 2706, 2745
                                                                     1033, 1036, 1038,
       665, 674, 954, 963,
                              \contentsnamefont .. 546
                                                                     1040, 1042, 1131,
       2463, 2465, 2646, 2703
                              \copy ..... 2485
                                                                     1132, 1133, 1135,
\changes ..... 146
                              \copyright .... 2178
\cite ... 627, 628, 639, 643
                                                                     1136, 1137, 1139,
                              \copyrightpermissionfootnoterule
                                                                     1140, 1141, 1143,
\citeA ..... 633
                                      . . . . . . . . . . . . . . . . <u>775</u>
                                                                     1144, 1145, 1147,
\citealt .....
                         632
                              \copyrightyear . 18, 2086
                                                                     1148, 1149, 1151,
\citeANP .....
                         629
                              \country 11, 1558, 2488, 2763
                                                                     1152, 1153, 1155,
\citeauthor .....
                         629
                              \csname .... 353, 481,
                                                                     1156, 1157, 1158,
\citeN .....
                         627
                                      483, 487, 494, 496,
                                                                     1160, 1161, 1162,
\citename .....
                                      500, 529, 549, 550,
                                                                     1164, 1165, 1166,
\citeNN .....
                                      564, 578, 1508,
                                                                     1168, 1170, 1171,
\citeNP .....
                                      1515, 1568, 1571,
                                                                     1175, 1176, 1177,
\citep ..... 628
                                      1796, 1797, 1799,
                                                                     1179, 1180, 1181,
\citestyle . . . 26, 351, 371
                                      1800, 1801, 1802,
                                                                     1183, 1184, 1185,
\citeyear .... 631
                                      1803, 1806, 1808,
                                                                     1187, 1188, 1189,
\citeyearNP .... 631
                                      2243, 2245, 3142, 3165
                                                                     1190, 1192, 1193,
\citeyearpar ... 630, 643
                              \CurrentOption ....
                                                                     1194, 1196, 1197,
\city . . 11, 1555, 2488, 2760
                                       . . . . . . 148, 149,
                                                                     1198, 1200, 1201,
\ClassError 35, 422, 446,
                                      150, 151, 152, 158, 159
                                                                     1202, 1204, 1205,
       1445, 1547, 1683,
                                                                     1206, 1207, 1209,
       1693, 1699, 1713,
                                                                     1210, 1211, 1213,
       1764, 2601, 2812, 3477
                              \day . . . . . . . . . . . . 2927
                                                                     1214, 1215, 1219,
\ClassInfo . . 161, 260,
                              \DeclareNewFootnote
                                                                     1220, 1221, 1225,
       1443, 1690, 1692,
                                      . . . . . . . . . . 779, 781
                                                                     1226, 1227, 1229,
       1696, 1698, 1710,
                               \DeclareOptionX . . . .
                                                                     1230, 1231, 1233,
       1712, 1715, 1926, 1930
                                       38, 148, 149, 150,
                                                                     1234, 1235, 1239,
\ClassWarning ... 26,
                                      151, 152, 154, 158, 159
                                                                     1240, 1241, 1245,
       171, 177, 183, 832,
                               \DeclareRobustCommand
                                                                     1246, 1247, 1251,
       835, 838, 884, 887,
                                      . . . . . . . . 633, 3161
                                                                     1252, 1253, 1255,
       957, 1492, 1561,
                               \DeclareTextFontCommand
                                                                     1256, 1257, 1259,
       1628, 1672, 1716,
                                      . . . . . . . . . . . . . . . 865
                                                                     1260, 1261, 1262,
       1933, 2785, 3467, 3470
                              \def 24, 38, 147, 153, 237,
                                                                     1264, 1265, 1266,
\ClassWarningNoLine
                                      239, 241, 243, 245,
                                                                     1268, 1269, 1270,
       . 875, 1678, 1702,
                                      247, 249, 251, 253,
                                                                     1272, 1273, 1274,
                                      255, 257, 288, 290,
       1817, 2595, 2598, 2771
                                                                     1276, 1277, 1278,
\cleaders . . . . . . . . 2485
                                      292, 294, 296, 298,
                                                                     1280, 1281, 1282,
\clearpage .... 2341
                                      300, 302, 304, 306,
                                                                     1284, 1285, 1286,
\clubpenalty ... 518, 524
                                      308, 310, 312, 313,
```

```
1288, 1289, 1290,
                               1730, 1731, 1766,
                                                               3234, 3235, 3238,
1292, 1293, 1294,
                               1772, 1777, 1783,
                                                               3239, 3244, 3245,
                               1784, 1793, 1794,
1296, 1297, 1298,
                                                               3246, 3247, 3256,
1300, 1301, 1302,
                               1820, 1879, 1882,
                                                               3257, 3258, 3259,
1304, 1305, 1306,
                               1883, 1885, 1923,
                                                               3276, 3277, 3278,
1308, 1309, 1310,
                               1924, 1940, 2070,
                                                               3279, 3288, 3289,
1312, 1313, 1314,
                               2086, 2088, 2090,
                                                               3290, 3291, 3337,
1316, 1317, 1318,
                               2107, 2108, 2109,
                                                               3338, 3347, 3348,
1320, 1321, 1322,
                               2113, 2126, 2131,
                                                               3426, 3428, 3444,
1324, 1325, 1326,
                               2140, 2147, 2236,
                                                               3445, 3446, 3450, 3457
1328, 1329, 1330,
                                                       \define@boolkey ....
                               2266, 2298, 2328,
                               2373, 2399, 2424,
1332, 1333, 1334,
                                                               . . . 51, 59, 67, 75,
                               2449, 2462, 2472,
                                                               84, 92, 104, 108,
1336, 1337, 1338,
1340, 1341, 1342,
                               2481, 2488, 2489,
                                                               112, 120, 128, 136,
1344, 1345, 1346,
                               2491, 2492, 2494,
                                                               1546, 1688, 1694, 1708
1348, 1349, 1350,
                               2495, 2497, 2502,
                                                       \define@choicekey ..
1352, 1353, 1354,
                               2503, 2507, 2508,
                                                               . 32, 1054, 1749, 1827
1356, 1357, 1358,
                               2510, 2511, 2513,
                                                       \define@cmdkey .... 1714
1360, 1361, 1362,
                               2541, 2542, 2546,
                                                       \definecolor .....
1364, 1365, 1366,
                               2547, 2550, 2551,
                                                               . . . 653, 654, 655,
1367, 1369, 1370,
                               2553, 2554, 2556,
                                                               656, 657, 658, 659, 660
1371, 1372, 1374,
                               2557, 2559, 2560,
                                                       \department .....
1375, 1376, 1378,
                               2562, 2563, 2565,
                                                               . 11, 1552, 2488, 2762
1379, 1380, 1382,
                               2566, 2568, 2569,
                                                       \Description .... 23, <u>873</u>
1383, 1384, 1385,
                               2571, 2572, 2574,
                                                       \description ..... <u>1045</u>
1387, 1388, 1389,
                               2576, 2581, 2588,
                                                       \descriptionlabel ..
1391, 1392, 1393,
                               2593, 2605, 2606,
                                                               ..... <u>1044</u>, 1047
1395, 1396, 1397,
                               2607, 2609, 2616,
                                                       \detokenize ..... 1492
1399, 1400, 1401,
                               2617, 2618, 2644,
                                                       \dimexpr ... 965, 984,
1403, 1404, 1405,
                               2645, 2652, 2674,
                                                               2276, 3039, 3048, 3128
1407, 1408, 1409,
                               2680, 2687, 2705,
                                                       \divide 2656, 2662, 2664,
                               2721, 2727, 2732,
1411, 1412, 1413,
                                                               2666, 2668, 2709, 2715
1415, 1416, 1417,
                               2749, 2755, 2756,
                                                       \do . . . . . . . . . . 287, 613
1419, 1420, 1421,
                               2757, 2759, 2760,
                                                       \do@url@hyp .... 613
1423, 1424, 1425,
                               2761, 2763, 2764,
                                                       \DocInput .... 20
1427, 1428, 1429,
                               2765, 2766, 2774,
                                                       \documentclass 8,427,429
1431, 1432, 1433,
                               2775, 2776, 2777,
                                                       \dp . . . . . . . . . 2335, 2343
1435, 1436, 1437,
                               2779, 2789, 2799,
1439, 1440, 1441,
                               2806, 2809, 2810,
1447, 1449, 1450,
                               2811, 2812, 2815,
                                                       \edef .... 148, 149,
1451, 1452, 1453,
                               2819, 2841, 2848,
                                                               150, 151, 152, 467, 2071
1473, 1475, 1476,
                               2849, 2850, 2851,
                                                       \editor ..... 9, <u>1477</u>
1477, 1483, 1526,
                               2857, 2867, 2878,
                                                       \egroup ..... 449,
                               2885, 2932, 2937,
1548, 1549, 1550,
                                                               794, 948, 959, 963,
1551, 1552, 1553,
                               2943, 3140, 3144,
                                                               975, 981, 1559,
1566, 1574, 1580,
                               3146, 3148, 3158,
                                                               1579, 2222, 2228,
1581, 1589, 1590,
                               3162, 3169, 3195,
                                                               2297, 2648, 2682,
1599, 1600, 1612,
                               3199, 3200, 3201,
                                                               2685, 2748, 2768,
1614, 1616, 1618,
                               3202, 3208, 3209,
                                                               2780, 2798, 2819, 2840
1620, 1622, 1624,
                               3211, 3212, 3214,
                                                       \else ..... 54,
1628, 1630, 1632,
                               3215, 3217, 3218,
                                                               62, 70, 79, 87, 99,
1634, 1641, 1642,
                               3220, 3221, 3222,
                                                               115, 123, 131, 141,
1670, 1672, 1674,
                               3223, 3224, 3227,
                                                               197, 231, 333, 354,
1682, 1687, 1718,
                               3228, 3231, 3232,
                                                               375, 382, 387, 398,
```

```
3087, 3097, 3104,
                                                      \expandafter 332, 334,
406, 414, 460, 467,
470, 482, 486, 490,
                              3109, 3117, 3120,
                                                             646, 795, 1506,
495, 499, 511, 523,
                              3136, 3137, 3145,
                                                             1507, 1513, 1514,
538, 621, 637, 643,
                              3169, 3428, 3433,
                                                             1568, 1571, 1796,
                                                             1797, 1799, 1800,
645, 668, 670, 787,
                              3440, 3449, 3453, 3476
851, 856, 882, 885,
                                                             1806, 1808, 3142, 3165
                       \email .... 10, 1560,
915, 955, 1438,
                              2616, 2680, 2727, 2766
1465, 1469, 1479,
                       \emph ..... 2190, 2192
                                                                   F
1495, 1502, 1505,
                       \empty .... 2944
                                                      \familydefault .... 867
1511, 1512, 1522,
                       \EnableCrossrefs .... 18
                                                      \fancyfoot .... 2958,
1525, 1530, 1533,
                       \end .... 21, 2883, 2913
                                                             2966, 2976, 2987,
1536, 1543, 1563,
                                                             2991, 3015, 3042,
                       \end@ACM@color@frame 2261
1586, 1595, 1601,
                                                             3053, 3054, 3072,
                       \end@dblfloat ....
1609, 1649, 1662,
                                                             3074, 3078, 3088,
                       \end@float .....
1676, 1691, 1697,
                                                             3098, 3107, 3112,
                       \endcsname 352, 353, 481,
1700, 1711, 1722,
                                                             3116, 3121, 3133, 3134
                              483, 487, 494, 496,
1725, 1735, 1738,
                                                      \fancyhead . 2953, 2954,
                              500, 529, 549, 550,
1741, 1746, 1780,
                                                             2955, 2956, 2961,
                              564, 578, 1508,
1805, 1810, 1811,
                                                             2962, 2963, 2964,
                              1515, 1569, 1572,
1812, 1815, 1928,
                                                             2970, 2972, 2973,
                              1796, 1797, 1799,
1932, 2095, 2101,
                                                             2980, 2982, 2983,
                              1800, 1801, 1802,
2127, 2138, 2142,
                                                             2984, 2992, 2993,
                              1803, 1806, 1808,
2143, 2144, 2156,
                                                             2995, 2996, 2999,
                              2243, 2245, 3142, 3165
2157, 2165, 2168,
                                                             3001, 3005, 3008,
                       \enddescription . . . 1051
2169, 2172, 2179,
                                                             3016, 3017, 3019,
                       \endgroup . . . 480, 519,
2184, 2191, 2196,
                                                             3020, 3023, 3025,
                              537, 552, 2213,
2199, 2200, 2204,
                                                             3029, 3032, 3047,
                              2539, 3144, 3146, 3424
2205, 2206, 2217,
                                                             3052, 3070, 3071,
                       \endlist .... 1049, 1051
2220, 2225, 2226,
                                                             3082, 3083, 3084,
                       \endMakeFramed .... 1776
2230, 2273, 2285,
                                                             3085, 3092, 3093,
                       \endminipage .... <u>784</u>
2288, 2291, 2294,
                                                             3094, 3095, 3102,
                       \endtrivlist .... 3361
2331, 2458, 2467,
                                                             3103, 3105, 3106,
                       \enspace ..... 3239
2476, 2482, 2483,
                                                             3110, 3111, 3127, 3132
2498, 2500, 2501,
                       environments:
                                                      \fancyheadoffset ...
2502, 2504, 2506,
                           abstract ......
                                                 18
                                                              . . . 3039, 3046, 3126
2507, 2510, 2577,
                           acks . . . . . . . . . . . . 25
                                                      \fancyhf .... 2940, 3064
2594, 2597, 2600,
                           anonsuppress ....
                                                      \fancypagestyle 2939, 3063
2612, 2618, 2625,
                          CCSXML ......
                                                      \fi ... 56, 64, 72, 81, 89,
2646, 2657, 2667,
                          marginfigure ....
                                                             101, 117, 125, 133,
2676, 2683, 2692,
                          margintable ....
                                                 34
                                                             143, 156, 175, 181,
2710, 2714, 2723,
                          printonly . . . . . . . . 24
                                                             194, 199, 228, 233,
2729, 2737, 2751,
                           screenonly ..... 24
                                                             258, 259, 271, 276,
2753, 2769, 2778,
                           sidebar ..... 34
                                                             289, 291, 293, 295,
2783, 2790, 2794,
                           teaserfigure ....
                                                             297, 299, 301, 303,
2802, 2809, 2815,
                           translatedabstract
                                                             305, 307, 309, 311,
2820, 2821, 2830,
                              313, 315, 317, 319,
2832, 2839, 2924,
                       \everypar . . . . . . 459,
                                                             321, 323, 325, 327,
2935, 2936, 2946,
                              514, 525, 2793, 2801
                                                             329, 331, 336, 338,
2957, 2965, 2975,
                       \excludecomment . 1788,
                                                             340, 342, 344, 346,
2986, 2990, 2997,
                              3432, 3434, 3438, 3439
                                                             347, 356, 358, 372,
3000, 3002, 3004,
                       \ExecuteOptionsX ...
                                                             377, 380, 389, 393,
3014, 3021, 3024,
                              . . . 50, 58, 66, 74,
                                                             400, 408, 416, 419,
3026, 3028, 3056,
                              83, 91, 103, 107,
                                                             432, 447, 451, 457,
3057, 3073, 3077,
                              111, 119, 127, 135, 145
                                                             462, 467, 473, 484,
```

```
488, 497, 501, 503,
                               2630, 2631, 2635,
                                                               . . . . . . . . 2154, 2158
                               2646, 2669, 2670,
526, 527, 540, 551,
                                                       \footrulewidth ....
                               2678, 2686, 2697,
570, 610, 614, 623,
                                                               2942, 3045, 3066, 3125
641, 643, 647, 650,
                               2716, 2717, 2725,
                                                       \foreignlanguage 435,438
                               2731, 2742, 2751,
677, 678, 679, 757,
                                                       \format ..... 32
773, 791, 817, 829,
                               2753, 2773, 2786,
                                                       \FrameCommand .... 1772
860, 861, 862, 868,
                               2788, 2796, 2798,
                                                       \FrameRestore .... 1775
875, 884, 887, 941,
                               2804, 2809, 2816,
                                                       942, 958, 972, 976,
                               2820, 2834, 2837,
                                                       \frenchspacing .... 3480
1003, 1442, 1461,
                               2838, 2839, 2877,
                                                       \fulltextwidth ....
                               2884, 2910, 2914,
1466, 1467, 1472,
                                                               . . . . . . <u>964</u>, 968, 984
1482, 1498, 1503,
                               2926, 2931, 2935,
1510, 1517, 1518,
                               2936, 2945, 2947,
                                                                    G
1523, 1524, 1532,
                               2948, 2953, 2954,
                                                       \g@addto@macro
1538, 1539, 1540,
                               2959, 2968, 2978,
                                                               157, 435, 438, 441,
1545, 1565, 1588,
                               2989, 2991, 3000,
                                                               449, 1481, 1513,
                               3002, 3011, 3012,
1598, 1605, 1611,
                                                               1516, 1531, 1537,
1627, 1655, 1668,
                               3013, 3015, 3024,
                                                               1544, 1564, 1582,
1680, 1684, 1693,
                               3026, 3035, 3036,
                                                               1584, 1587, 1591,
                               3037, 3040, 3043,
1699, 1707, 1713,
                                                               1593, 1596, 1602,
1727, 1728, 1737,
                               3056, 3057, 3058,
                                                               1603, 1608, 1610,
1743, 1744, 1748,
                               3072, 3075, 3081,
                                                               1650, 1663, 1736,
1762, 1769, 1782,
                               3091, 3101, 3107,
                                                               1742, 1781, 1801,
1804, 1812, 1813,
                               3108, 3112, 3113,
                                                               1808, 2090, 2094,
1819, 1840, 1843,
                               3119, 3122, 3123,
                                                               2096, 2107, 2110,
1846, 1851, 1854,
                               3136, 3137, 3138,
                                                               2613, 2626, 2677,
1857, 1860, 1863,
                               3156, 3167, 3169,
                                                               2684, 2693, 2724,
1866, 1869, 1872,
                               3237, 3242, 3264,
                                                               2730, 2738, 2775, 2776
1875, 1878, 1922,
                               3296, 3334, 3353,
                                                              . . . . . 156, 1455,
                                                       \gdef
1938, 1939, 2085,
                               3384, 3385, 3410,
                                                               1456, 1457, 1458,
2097, 2103, 2106,
                               3411, 3417, 3428,
                                                               1460, 1473, 1478,
2117, 2118, 2127,
                               3436, 3442, 3445,
                                                               1480, 1501, 1504,
2129, 2141, 2148,
                               3455, 3456, 3457, 3479
                                                               1506, 1509, 1521,
2149, 2150, 2151,
                       \firstpagestyle . . . . <u>3062</u>
                                                               1529, 1535, 1568,
2155, 2163, 2166,
                       \floatname .....
                                                               1571, 1645, 1658,
2167, 2174, 2175,
                       \flushbottom 803, 805,
                                                               1685, 1717, 1734,
2176, 2181, 2193,
                               807, 809, 811, 814, 816
                                                               1740, 1779, 1784,
2198, 2205, 2206,
                       \footnote . . . . . . . . . 2812
                                                               1797, 1799, 1800,
2207, 2208, 2209,
                       \footnotemark 593, 1582,
                                                               1806, 2330, 2611,
2210, 2211, 2212,
                               1591, 2775, 2776, 2810
                                                               2615, 2620, 2650,
2214, 2218, 2223,
                       \footnoterule .... 782
                                                               2651, 2672, 2673,
2224, 2229, 2232,
                       \footnotesep ... 568, 581
                                                               2675, 2679, 2681,
2233, 2252, 2263,
                       \footnotesize 574, 2923,
                                                               2688, 2719, 2720,
2283, 2284, 2287,
                               2937, 2958, 2966,
                                                               2722, 2726, 2728,
2290, 2293, 2294,
                               2976, 2987, 2991,
                                                               2733, 2758, 2759, 2764
2324, 2333, 2345,
                               2999, 3005, 3015,
                                                       \geometry . . . 683, 686,
2371, 2397, 2423,
                               3054, 3074, 3078,
                                                               693, 700, 707, 714,
2448, 2452, 2460,
                               3088, 3098, 3107,
                                                               721, 728, 735, 744, 751
2469, 2478, 2486,
                               3112, 3118, 3134, 3464
                                                       \getrefnumber . . 1677,
2499, 2500, 2502,
                       \footnotetext . . 1585,
                                                              1701, 1816, 2273, 2809
2504, 2506, 2507,
                               1587, 1594, 1597, 1604
                                                      \global . 513, 516, 552,
2510, 2512, 2538,
                       \footnotetextauthorsaddresses
                                                              572, 873, 883, 886,
2573, 2580, 2596,
                               . . . . . . . 2139, 2146
                                                               956, 983, 1448,
2599, 2603, 2614,
                       \footnotetextcopyrightpermission 1462, 1494, 1496,
```

1497, 1542, 2248,	\if@ACM@anonymous	\if@ACM@printfolios
2249, 2253, 2255,	120, 1500,	1708, 2945, 2947,
2269, 2282, 2492,	1512, 1519, 1543,	2953, 2954, 2991,
2494, 2499, 2503,	1563, 1583, 1592,	3015, 3072, 3107, 3112
2508, 2511, 2589,	1601, 2093, 2099,	\if@ACM@review
2590, 2591, 2608,	2115, 2144, 2933, 3437	. 75, 2862, 2879, 2886
2632, 2636, 2646,	\if@ACM@authordraft	\if@ACM@screen 51,615,3430
2698, 2701, 2743,	136, 661, 2159	\if@ACM@sigchiamode
2781, 2784, 2872,	\if@ACM@authorversion	165, 559,
2876, 3365, 3389,	84, 2165, 2185	669, 866, 966, 973,
3391, 3393, 3405, 3409	\if@ACM@badge 1636	2127, 2129, 2646, 3038
\grantnum 25, <u>3427</u>	\if@ACM@balance	\if@ACM@timestamp
\grantsponsor $\frac{25}{3426}$	104, 3386, 3414	<u>128</u> , 2915, 3041, 3114
·	\if@ACM@citypresent	\if@ACM@urlbreakonhyphens
Н	2584, 2597	<u>59,</u> 612
\hbox . 583, 2126, 2131, 2484		\if@acmowned 1825
\headrulewidth 2941, 3065	\if@ACM@countrypresent	\if@Description@present
\height		869,
1647, 1653, 1660, 1666	\if@ACM@engage . <u>166</u> ,	882, 885, 955, 2783
\hfill 2474, 2875	378, 391, 1929,	\if@filesw 548,648
\href . 1570, 1573, 1648,	2170, 2214, 2998, 3022	\if@insideauthorgroup
1654, 1661, 1667,	\if@ACM@instpresent	
2072, 2073, 3448, 3452	<u>2582</u> , 2594	\if@nobreak 458
\hrule 776, 783, 2474	\if@ACM@journal	\if@noskipsec 451, 515
\hsize . 575, 1774, 2125,	<u>163</u> , 229, 373,	\if@printcopyright .
2268, 2271, 2449,	385, 396, 404, 412, 911, 1469, 1723,	<u>1821,</u> 2177
2451, 2453, 2462, 2464, 2472, 2514,	2490, 2769, 2792, 2800	\if@printpermission
2634, 2644, 2700, 2745	\if@ACM@journal@bibstrip	<u>1823,</u> 2166
\hskip 478, 492, 522,		\if@twocolumn . 3415, 3457
535, 539, 2485, 3358	2145, 2169, 2189,	\if@undescribed@images
\hspace 1651,	2201, 2826, 2950, 3067	<u>871</u> , 874
1664, 1772, 1951,	\if@ACM@maketitle@typeset	\IfBeginWith 1567
1962, 1971, 1978,	445, <u>1052</u> , 1682	\ifcase 201, 235,
1985, 1999, 2011,	\if@ACM@manuscript .	596, 681, 760, 798,
2019, 2033, 2041,	162,	918, 987, 1129,
2048, 2055, 2649, 2703	268, 1720, 2168, 2182	1624, 1751, 1886,
\ht 2334, 2342	\if@ACM@natbib	1941, 2301, 2348,
\Huge . 2408, 2410, 2412,	<u>112,</u> 279, 370, 626	2374, 2400, 2425,
2414, 2416, 2418, 2420	\if@ACM@natbib@override	2515, 2543, 2658,
\hypersetup		2711, 2887, 2951,
616, 622, 624, 2237	\if@ACM@newfonts 830, 841	3068, 3204, 3248,
\hyphenpenalty 3463	\if@ACM@nonacm 92, 670,	3280, 3339, 3366, 3387
•	1676, 1700, 1815,	\ifcsname 352 \ifdim 455, 475, 507, 532,
\:£ 222	1925, 2152, 2200,	2279, 2336, 2344, 2874
\if	2769, 2821, 2957,	\IfEq 2069, 2075,
\if@ACM@acmcp <u>168</u> , 273,	2965, 2975, 2986,	2076, 2077, 2078,
1767, 2142, 2157, 2225, 2259, 2450,	2994, 3018, 3073,	2079, 2080, 2081, 2082
2633, 3044, 3124, 3240	3077, 3087, 3097, 3117	\IfFileExists 832, 835, 838
\if@ACM@acmthm . 67, 3310	\if@ACM@pbalance 108, 3364	\IfInteger 1715
\if@ACM@affiliation@obeypu	· —	\ifluatex 852
	1694, 2250	\ifNAT@numbers 643
2483, 2500, 2502,	\if@ACM@printccs	\ifnum 170, 176,
2504, 2505, 2507, 2510	<u>1688</u> , 2219	182, 195, 467, 468,

```
482, 486, 495, 499,
                                      2494, 2495, 2496,
                                                             \Large .... 2541, 2559,
       1677, 1701, 1810,
                                                                     3214, 3215, 3217,
                                      2500, 2757, 2797,
       1811, 1812, 1816,
                                                                     3218, 3220, 3234, 3235
                                      2805, 2811, 2819, 3359
                                                             \large 2160, 2546, 2551,
       1836, 1841, 1844,
                              \immediate .... 550, 649
       1847, 1852, 1855,
                              \includecomment . . . .
                                                                     2554, 2569, 2571,
       1858, 1861, 1864,
                                      . . . 3431, 3435, 3441
                                                                     3208, 3209, 3211, 3212
       1867, 1870, 1873,
                              \includegraphics ...
                                                             \lastbox .. 517, 2793, 2801
       1876, 2117, 2153,
                                      . . . . 1648, 1654,
                                                             \leaders ..... 2474
       2273, 2655, 2708,
                                      1661, 1667, 2072, 2271
                                                             \leavevmode 451, 2474, 2702
       2750, 2752, 2809, 3115
                              \indent ..... 3338
                                                             \leftmargin 1028, 1033,
\ifPDFTeX ..... 818
                              \input ..... 819
                                                                     1036, 1038, 1040, 1042
\IfSubStr . . . . 1492, 1561
                              \InputIfFileExists .. 25
                                                             \leftmargini 1012, 1013,
\ifvmode ..... 2482
                              \institution .....
                                                                     1014, 1015, 1028, 1029
                                      . 11, 1551, 2488, 2759
\ifvoid ......
                                                             \leftmarginii .....
                              \interfootnotelinepenalty
\ifx . 155, 234, 288, 290,
                                                                     . . . . 1018, 1019,
                                      . . . . . . . . . . . . . . . 562
       292, 294, 296, 298,
                                                                     1020, 1021, 1033, 1034
                              \interlinepenalty ..
       300, 302, 304, 306,
                                                             \leftmarginiii ....
                                      479, 536, 562
                                                                     1021, 1022, 1036, 1037
       308, 310, 312, 314,
                              \item ..... 3358, 3460
       316, 318, 320, 322,
                                                             \leftmarginiv ....
       324, 326, 328, 330,
                              \itshape .....
                                                                     1022, 1023, 1038, 1039
       335, 337, 339, 341,
                                       2171, 2173, 3201,
                                                             \leftmarginv .....
                                      3202, 3223, 3224,
       343, 345, 381, 421,
                                                                     1023, 1024, 1040, 1041
                                      3244, 3256, 3278, 3347
       645, 1459, 1463,
                                                             \leftmarginvi ....
       1465, 1477, 1499,
                                                                     . . . 1024, 1042, 1043
       1502, 1520, 1522,
                                                             \leftskip . 2473, 2746, 3197
                              \jobname ..... 547, 550
       1527, 1528, 1534,
                                                             \let .... 309, 311,
       1607, 1644, 1657,
                                                                     323, 325, 327, 353,
                                           K
       1676, 1732, 1733,
                                                                     469, 584, 585, 627,
                              \kern 775, 776, 782, 783, 2474
       1739, 1746, 1778,
                                                                     628, 629, 630, 631,
       1796, 1805, 1815,
                              \keywords . . . . . . . 15, <u>1674</u>
                                                                     632, 635, 639, 797,
       2104, 2138, 2143,
                              \keywordsname .....
                                                                     863, 877, 878, 880,
       2194, 2205, 2206,
                                      374, 376, 386, 388,
                                                                     881, 888, 889, 890,
       2217, 2220, 2226,
                                      397, 399, 405, 407,
                                                                     891, 892, 893, 894,
       2230, 2285, 2288,
                                      413, 415, 1578, 2227
                                                                     895, 896, 897, 898,
       2291, 2294, 2329,
                                                                     899, 900, 901, 902,
       2458, 2467, 2476,
                                            L
                                                                     903, 904, 905, 906,
       2498, 2577, 2610,
                              \1@section .....
                                                                     907, 946, 947, 951,
       2618, 2619, 2674,
                              \1@subsection .. 555, 556
                                                                     952, 961, 962, 967,
                                                       557
       2680, 2687, 2721,
                              \l@subsubsection ...
                                                                     968, 969, 1032,
       2727, 2732, 2770,
                              \labelenumi .....
                                                                     1047, 1051, 1554,
       2778, 2790, 2815,
                              \labelenumii .....
                                                                     1555, 1556, 1557,
       2820, 2832, 2839,
                              \labelenumiii .....
                                                                     1558, 1669, 1675,
       2924, 2935, 2944,
                              \labelenumiv .....
                                                                     1786, 1789, 2105,
       3000, 3002, 3024,
                              \labelsep ......
                                                                     2120, 2121, 2122,
       3026, 3056, 3057,
                                       1006, 1014, 1019,
                                                                     2123, 2135, 2136,
       3136, 3137, 3142,
                                      1029, 1034, 1037,
                                                                     2137, 2140, 2147,
       3165, 3169, 3428,
                                      1039, 1041, 1043, 3358
                                                                     2234, 2248, 2249,
       3445, 3447, 3451, 3476
                                                                     2299, 2300, 2325,
                              \labelwidth .....
                                       1029, 1034, 1037,
\ifxetex ..... 847
                                                                     2326, 2509, 2608,
                                                                     2632, 2698, 2704,
\ignorespaces ....
                                      1039, 1041, 1043, 1046
                              \LARGE 2402, 2404, 2406,
                                                                     2743, 2748, 2807,
       . . . 528, 568, 581,
       873, 1550, 1551,
                                      2422, 2433, 2435,
                                                                     2808, 2842, 2843,
                                      2437, 2439, 2441.
                                                                     2845, 2846, 2854,
       1553, 1566, 2488,
       2489, 2491, 2493,
                                      2445, 2550, 2553, 2568
                                                                     2855, 2856, 2858,
```

0050 0040 0145	400 4500 4504	1405 1405 0075
2859, 2860, 3147,	430, 1703, 1704,	\newcount . 1485, 1487, 2865
3149, 3151, 3152,	1705, 1764, 1934, 1935	\newcounter 1790, 2918, 2920
3154, 3160, 3163,	\metadata@authors	\newdimen
3166, 3460, 3465,	2234, 2235, 2238	. 277, 964, 1004, 2641
3466, 3473, 3474, 3475	\mktitle@bx <u>2112</u> , 2334,	\newenvironment . 443,
\libertineLF 865	2335, 2338, 2342,	949, 960, 1771, 2089
\lineskip 2703, 2747	2343, 2350, 2352,	\newfloat 943
\linespacing 545, 546	2354, 2356, 2358,	\newif 162, 163, 164,
\liningnums <u>863</u>	2360, 2362, 2364,	165, 166, 168, 830,
\list 1045	2366, 2368, 2370,	869, 871, 1052,
\listisep . 1026, 1027, 1031	2454, 2463, 2473,	1489, 1821, 1823,
\listparindent 1030	2636, 2701, 2702, 2781	1825, 2582, 2584, 2586
\LoadClass 261	\month 1623, 2927	\newlength
\long 445, 560, 571, 946,	\moveleft 983	1636, 1638, 1639, 2864
•		\newsavebox 2863
950, 961, 1682,	N	\newskip 1026, 2642
1685, 1687, 2090, 2848	\NAT@@setcites 349	\newtheorem
\loop 2337, 2871	\NAT@aysep 340	3313, 3316, 3319,
\LTX@adddotafter	\NAT@citetp 635	3322, 3325, 3329, 3332
3166, 3169	\NAT@close	\newtheoremstyle
	289, 291, 293, 295, 338	3265, 3297
M	\NAT@cmprs 317, 319, 321	\newwrite 549
\makeatletter 542	\NAT@cmt 344	\next 3144, 3146, 3156
\makebox 2160,	\NAT@ctype 635	\nobreak 5144, 5146, 5136
3047, 3052, 3127, 3132	\NAT@find@eq 332	\noindent 508, 2817
\MakeFramed 1774	\NAT@fullfalse 635	
\makelabel 1047	\NAT@longnamestrue . 329	1747, 2137, 2222,
\MakeTextUppercase .	\NAT@merge 323, 325, 327	2228, 2303, 2305,
2611, 2613, 3199,	-	2307, 2309, 2340,
3208, 3211, 3214,	\NAT@nmfmt 331	2347, 2454, 2456,
3217, 3227, 3231, 3234	\NAT@numbersfalse 303	2459, 2468, 2474,
\maketitle 19, <u>2113</u>	\NAT@numberstrue 305, 307	2475, 2477, 2575,
\MakeUppercase 3153	\NAT@open 289,	2636, 2637, 2701,
\marginfigure 949	291, 293, 295, 336, 635	2747, 2781, 2782,
	\NAT@partrue 635	2817, 2818, 2851, 3348
marginfigure (env.) 34	\NAT@rem@eq 334	\noindentparagraph .
\marginpar 560, 948, 954, 963	\NAT@sep 297, 299, 301, 346	2315, 3186
\marginparsep 965, 3039	\NAT@sort 313, 315, 321	\nolinkurl 2682,
$\mbox{\mbox{marginparwidth}}$. $965, 3039$	\NAT@superfalse 305	2685, 2728, 2730, 2766
\margintable <u>960</u>	\NAT@supertrue 307	\normalbaselines 2645
margintable (env.) 34	\NAT@swafalse 634	\normalcolor 789
\mathchardef 2682, 2685	\NAT@up 331	\normalfont 583,
\mbox 331	\NAT@yrsep 342	1747, 2131, 2542,
\mdseries 2427, 2429,	\NeedsTeXFormat 1	2547, 2556, 2557,
2431, 2435, 2437,	\newblock 636	2559, 2560, 2572,
2439, 2441, 2443,	\newbox	2868, 3259, 3276,
2445, 2447, 2563, 2566	2112, 2265, 2480, 2640	3288, 3291, 3356, 3480
\medskip 2303, 2305,	\newcommand . 359, 365,	\normalparindent 774
2307, 2309, 2636,	420, 434, 437, 440,	\normalsize
2638, 2702, 2787, 2817	642, 873, 1454,	2424, 2542, 2556,
\MessageBreak	1541, 1576, 1606,	2557, 2560, 2869, 3480
172, 178, 184, 185,	1643, 1656, 1731,	\num@authorgroups
186, 187, 188, 189,	1791, 1881, 2098,	1485,
190, 191, 192, 423,	2496, 2505, 2922,	1496, 2117, 2658,
424, 425, 426, 428,	3186, 3418, 3427, 3443	2662, 2664, 2711, 2752

```
3295, 3341, 3342,
\num@authors .....
                                       1418, 1422, 1426,
                                       1430, 1434, 1624,
                                                                      3343, 3344, 3345,
         1487, 1494, 1508,
                                       1625, 1626, 1754,
                                                                      3346, 3349, 3350,
       1515, 1569, 1572, 2750
                                       1756, 1758, 1760,
                                                                      3351, 3352, 3368,
\number ..... 467
                                       1887, 1889, 1892,
                                                                      3369, 3370, 3372,
\numberline .... 487,500
                                       1894, 1895, 1897,
                                                                      3374, 3376, 3378,
\numexpr . 2917, 2919, 2921
                                       1899, 1901, 1904,
                                                                      3380, 3381, 3383,
\nxandlist .... 2235
                                       1906, 1909, 1911,
                                                                      3390, 3392, 3394,
                                       1914, 1917, 1920,
                                                                      3396, 3398, 3400,
             O
                                                                      3402, 3404, 3406, 3408
                                       1942, 1953, 1964,
\onehalfspacing ....
                                       1972, 1979, 1986,
                                                               \orcid ..... 10, <u>1566</u>
\openout .....
                                       2000, 2012, 2020,
                                                               \outer@nobreak .... 980
\or .... 204,
                                       2034, 2042, 2049,
       206, 208, 210, 212,
                                       2056, 2061, 2067,
                                                                            P
       214, 216, 218, 221,
                                       2304, 2306, 2308,
                                                               \p@ . . . . . . . . . 553, 758,
       224, 238, 240, 242,
                                       2310, 2312, 2314,
                                                                      765, 775, 776, 782,
       244, 246, 248, 250,
                                       2316, 2318, 2320,
                                                                      783, 3045, 3125,
       252, 254, 256, 598,
                                       2322, 2351, 2353,
                                                                      3171, 3175, 3179,
       599, 600, 601, 602,
                                       2355, 2357, 2359,
                                                                      3180, 3183, 3184,
       603, 605, 606, 608,
                                       2361, 2363, 2365,
                                                                      3187, 3188, 3192,
       609, 685, 692, 699,
                                       2367, 2369, 2377,
                                                                      3193, 3356, 3458, 3461
       706, 713, 720, 727.
                                       2379, 2381, 2383,
                                                               \PackageError 56, 64, 72,
       734, 743, 750, 762,
                                       2385, 2387, 2389,
                                                                      81, 89, 101, 105,
       763, 764, 766, 767,
                                       2391, 2393, 2395,
                                                                      109, 117, 125, 133, 143
       768, 769, 770, 771,
                                       2403, 2405, 2407,
                                                               \PackageInfo .... 53,
       772, 800, 801, 802,
                                       2409, 2411, 2413,
                                                                      55, 61, 63, 69, 71,
       804, 806, 808, 810,
                                       2415, 2417, 2419,
                                                                      77, 80, 86, 88, 94,
       812, 813, 815, 920,
                                       2421, 2428, 2430,
                                                                      100, 114, 116, 122,
       921, 922, 923, 924,
                                       2432, 2434, 2436,
                                                                      124, 130, 132, 138,
       926, 929, 934, 939,
                                       2438, 2440, 2442,
                                                                      142, 1173, 1217,
       940, 989, 990, 991,
                                       2444, 2446, 2518,
                                                                      1223, 1237, 1243, 1249
       992, 993, 994, 999,
                                       2520, 2522, 2524,
                                                               \PageIndex ..... 15
       1000. 1001. 1002.
                                       2526, 2528, 2530,
                                                               \pageref .... 2929
       1134, 1138, 1142,
                                       2532, 2534, 2536,
                                                               \pagestyle .... 3060
       1146, 1150, 1154,
                                       2545, 2548, 2549,
       1159, 1163, 1167,
                                                               \par .... 435,
                                       2552, 2555, 2558,
       1174, 1178, 1182,
                                                                      438, 452, 508, 544,
                                       2561, 2564, 2567,
       1186, 1191, 1195,
                                                                      785, 978, 1579,
                                       2570, 2660, 2661,
                                                                      1747, 2140, 2147,
       1199, 1203, 1208,
                                       2663, 2665, 2713,
       1212, 1218, 1224,
                                                                      2166, 2171, 2173,
                                       2890, 2892, 2894,
                                                                      2222, 2228, 2271,
       1228, 1232, 1238,
                                       2896, 2898, 2900,
                                                                      2286, 2289, 2292,
       1244, 1250, 1254,
                                       2902, 2904, 2906,
       1258, 1263, 1267.
                                                                      2303. 2305. 2307.
                                       2908, 2960, 2969,
       1271, 1275, 1279,
                                                                      2309, 2350, 2352,
                                       2979, 3076, 3086,
       1283, 1287, 1291,
                                                                      2354, 2366, 2370,
                                       3096, 3206, 3207,
                                                                      2459, 2461, 2468,
       1295, 1299, 1303,
                                       3210, 3213, 3216,
       1307, 1311, 1315,
                                                                      2471, 2474, 2477,
                                       3219, 3225, 3229,
       1319, 1323, 1327,
                                                                      2479, 2502, 2504,
                                       3233, 3236, 3250,
       1331, 1335, 1339,
                                                                      2506, 2507, 2575,
                                       3251, 3252, 3253,
                                                                      2579, 2636, 2638,
       1343, 1347, 1351,
                                       3254, 3255, 3260,
                                                                      2645, 2647, 2675,
       1355, 1359, 1363,
                                       3261, 3262, 3263,
       1368, 1373, 1377,
                                                                      2677, 2684, 2693,
                                       3282, 3283, 3284,
       1381, 1386, 1390,
                                                                      2702, 2704, 2722,
                                       3285, 3286, 3287,
       1394, 1398, 1402,
                                                                      2724. 2730. 2738.
                                       3292, 3293, 3294,
       1406, 1410, 1414,
                                                                      2746, 2748, 2779,
```

2790 2791 2792	\raisabay	351 374 376 370
2780, 2781, 2783,	\raisebox	351, 374, 376, 379,
2797, 2817, 2840,	1647, 1653, 1660,	386, 388, 390, 392,
2844, 2848, 2851, 3354	1666, 2160, 3048, 3128	397, 399, 401, 405,
\paragraph 3182	\real@adddotafter	407, 409, 413, 415,
\parbox 665,	3151, 3154	417, 867, 1044,
674, 2455, 2465, 2868	\realSectionformat .	1491, 1560, 2091,
\parindent <u>758</u> , 774,	3147, 3159, 3160	2124, 2762, 2941,
1013, 2140, 2147,	\received 19, <u>1731</u>	2942, 3045, 3065,
2164, 2270, 3182,	\RecordChanges 17	3066, 3125, 3170,
3198, 3245, 3277, 3461	\ref 2829, 2836	3174, 3178, 3182, 3191
\parskip <u>758</u> , <u>2164</u> , <u>3461</u>	\refname 282, 283	\renewenvironment
\part 3191	\refstepcounter 471	945, 1045, 1681, 3354
\PassOptionsToClass	\relax 170,	\repeat 2344, 2874
158, 159	176, 182, 195, 202,	\RequirePackage 29,
\pdfgentounicode 827	236, 278, 332, 333,	30, 31, 262, 263,
\pdfglyphtounicode .	421, 453, 472, 474,	264, 265, 266,
820, 821,	478, 492, 506, 521,	267, 269, 272,
822, 823, 824, 825, 826	531, 539, 550, 597,	274, 275, 280, 383,
\pdfstringdefDisableComman		586, 587, 651, 652,
588	919, 988, 1130,	662, 671, 680, 777,
\phantomsection	1463, 1486, 1488,	828, 842, 848, 849,
283, 2791, 3422	1494, 1496, 1606,	853, 854, 857, 858,
\popQED 3361	1607, 1677, 1701,	859, 909, 1787,
\position 11, 1550,	1752, 1775, 1796,	2853, 3371, 3373,
1554, 1555, 1556,	1805, 1815, 1816,	3375, 3377, 3379,
1557, 1558, <u>2488</u> , 2757		3382, 3395, 3397,
\postcode	1836, 1841, 1844, 1847, 1852, 1855,	3399, 3401, 3403, 3407
. 11, 1557, 2488, 2756	1858, 1861, 1864,	\reset@font 561, 574
printonly (env.) 24		
\ProcessOptionsX 160	1867, 1870, 1873,	\reversemarginpar 742
	1876, 1886, 1941,	\rightarrow 1793
\proof <u>3354</u> \proofname <u>3354</u>	2135, 2136, 2153,	\rightskip 3196
•	2278, 2279, 2282,	\rotatebox 3049, 3129
\protect 487, 500	2302, 2349, 2375,	\rule 568, 581
\protected@edef	2401, 2426, 2516,	
472, 563, 577	2544, 2643, 2653,	S
\protected@write 2281	2654, 2655, 2656,	\savebox 2868
\providecommand	2659, 2662, 2664,	screenonly (env.) 24
636, 640, 3243	2666, 2668, 2671,	\scriptsize 2272, 2871, 2875
\ProvidesClass 5	2703, 2706, 2707,	
\ProvidesFile 3	2708, 2709, 2712,	\scshape 3246, 3337
\ps@headings 2856, 2860	2715, 2718, 2750,	\section 282,
\ps@myheadings 2855, 2859	2752, 2775, 2809,	2311, 2313, 2317,
\ps@plain 2854, 2858	2866, 2888, 2889,	2319, 2321, 2323,
\pushQED 3355	2891, 2893, 2909,	2795, 2803, 3170, 3421
\put 2882, 2912	2919, 2921, 2924,	\section@raggedright
	2952, 3069, 3115,	
Q	3142, 3165, 3169,	3199, 3200, 3208,
\qed 3355	3205, 3249, 3281,	3209, 3211, 3212,
529, 2971,	3340, 3356, 3367,	3214, 3215, 3217,
2974, 2981, 2985, 3116	3388, 3447, 3451, 3461	3218, 3220, 3221,
	\removelastskip 544	3222, 3227, 3228,
R	\renewcommand 281, 285,	3231, 3232, 3234, 3235
\raggedright	286, 289, 291, 293,	\Sectionformat
2455, 2473, 2746, 3462	295, 297, 299, 301,	3143, 3147, 3149, 3160

\SelectFootnoteRule	1531, 1534, 1535,	\textwidth 965, 984, 985,
778, 780	1537, 2247, 2249, 2936	2125, 2449, 2462,
\selectlanguage 1577, 2799	\shortcite 639, 642	2472, 2514, 2653, 2700
\set@ACM@acmcpbox	\shorttitle 2956, 2964,	\thanks 13, <u>2091</u> , 2848
2260, 2265	2974, 2985, 2992, 3016	\thankses
\setbox 517, 572,	\showeprint 3443	2094, 2096, 2138, 2848
983, 2269, 2338,	\sidebar 943	\the 1508, 1515, 1569,
2454, 2463, 2473,	sidebar (env.) <u>34</u>	1572, 1621, 1623,
2484, 2636, 2646,	\skip 788	2282, 2871, 2875, 2927
	\small 561, 948,	\theACM@time@hours .
2701, 2781, 2793, 2801	955. 963. 1747.	2921, 2928
\setcctype <u>16</u> , <u>1881</u>	2303, 2305, 2307,	\theACM@time@minutes 2928
\setcitestyle		
26, 286, 360, 366	2309, 2547, 2572,	
\setcopyright <i>16</i> , <u>1879</u>	2793, 2801, 2817, 3072	\theenumii 996
\setcounter 2130, 2215,	\smallskipamount 1027	\theenumiii 997
2332, 2919, 2921,	\smash 1646, 1652, 1659, 1665	\theenumiv 998
3203, 3226, 3230, 3241	\space 496, 1493,	\thefootnote 2124
\setengagemetadata .	1562, 1706, 2243,	\theindex <u>3457</u>
	2510, 3056, 3136,	\theoremstyle
\setkeys . 38, 174, 180,	3428, 3467, 3470, 3478	3308, 3311, 3327, 3335
1447, 1718, 1766,	\specialcomment 3419	\thepage
	\standardpagestyle . <u>2938</u>	2929, 2945, 2947,
1879, 2621, 2622,	\startPage <u>15</u> , <u>1670</u>	2953, 2954, 2991,
2627, 2628, 2689,	\state . 11, 1556, 2488, \(\frac{2761}{2761} \)	3015, 3072, 3107, 3112
2690, 2694, 2695,	\stepcounter <u>1585</u> , <u>1587</u> ,	\thispagestyle 2339, 2346
2734, 2735, 2739, 2740	1594, 1597, 1604, 1795	\thmname 3275, 3307
\setlength <mark>758, 759, 765</mark> ,	\StrDel 2497	\thmnote 3275, 3307
774, 1006, 1007,	\streetaddress	\thmnumber 3275, 3307
1012, 1018, 1021,	. 11, 1554, 2488, 2755	\thr@@ 327
1022, 1023, 1024,	\string . 423, 424, 427,	\time 2916, 2919, 2921
1637, 1640, 2270, 2870		
\setmonofont 850, 855	429, 649, 1493,	\title 10, 2813
\settopmatter	1562, 1628, 1672,	\titlenote 14, 1581, 2814
18, 98, 1706,	1706, 2282, 2813,	\topsep 1031, 1035, 3356
<u>1718</u> , 1719, 1721,	2814, 3467, 3470, 3478	\translatedabstract 443
1724, 1726, 1729, 2825	\strut 3050, 3130	translatedabstract
\setTrue 543	\strutbox 568, 581	(env.) 21
\SetWatermarkColor .	\subsection 3174	\translatedkeywords
	\subsubsection 3178	
664, 673	\subtitle 10, <u>1483</u>	\translatedsubtitle
\SetWatermarkFontSize	\subtitlenote <i>14</i> , <u>1590</u>	
663, 672		\translatedtitle . 21, 434
\SetWatermarkText 665, 674	T	\trivlist 3357
\sfdefault 867	\teaserfigure <u>2089</u>	\tw@ 325
\sffamily 2402, 2404,	teaserfigure (env.) 18	\two@digits 2927, 2928
2406, 2408, 2410,	\terms 15, 1672	\twocolumn . 2356, 2358,
2412, 2416, 2420,	\textbf 1798, 1810, 2851	2360, 2362, 2364, 2368
2422, 2541, 2546,	\textbullet 591, 1797,	2000
2550, 2571, 2937,	2971, 2974, 2981, 2985	U
3199, 3200, 3201,	\textheight 2336, 2338,	\unskip 520, 590,
3208, 3209, 3211,	2344, 2874, 3048, 3128	786, 1553, 1559,
3212, 3217, 3218,	\textit 1811,	1566, 2485, 2488,
3227, 3228, 3231, 3232	2827, 2831, 2832, 2833	2489, 2491, 2493,
\shortauthors 19, 1520,	\textrightarrow	2494, 2495, 2496,
	592, 1793, 1807	
1521, 1528, 1529,	392, 1/93, 180/	2510, 2579, 2755,

```
2756, 2757, 2759,
                                      2473, 2636, 2701, 2781
                                                                     545, 568, 581, 759,
       2760, 2761, 2762,
                                                                     796, 913, 917, 928,
                              \vskip 509, 544, 788, 796, 978
       2763, 2764, 2766,
                                                                     1012, 1018, 1030,
                              \volume{1} \vspace .... 2280, \underline{3465}
       2811, 2819, 2836, 2849
                              \vsplit ..... 2338
                                                                     2140, 2147, 2160,
                              \verb|\vtop ..... 2646|
\unvbox . 573, 790, 795,
                                                                     2164, 2253, 2255,
       2340, 2636, 2702, 2781
                                                                     2270, 2746, 2793,
                                           \mathbf{W}
                                                                     2801, 2941, 2942,
\upshape .... 1044
                              \wd . . . . . . . . . 985, 2485
\url . 1779, 1781, 1923, 3428
                                                                     3047, 3052, 3065,
                              \write ..... 649
\UrlBreakPenalty ...
                                                                     3066, 3127, 3132,
      . . . . . . . 2682, 2685
                                                                     3170, 3174, 3178,
                                           \mathbf{X}
\urlstyle ... 595, 604, 607
                                                                     3186, 3191, 3198,
                              \xdef ..... 336,
\usebox ..... 2882, 2912
                                                                     3257, 3289, 3458, 3461
                                      338, 340, 342, 344, 346
\usepackage .....
                                                             \z@skip 544, 978, 1035, 3197
       . . 9, 10, 11, 12, 13, 14
                                                             \zposy .... 2276, 2277
                                           Y
                                                             \zrefused . . . . 2274, 2275
                              \year ..... 1621, 2927
                                                             \zsaveposy . . . . 1775, 2295
                                           \mathbf{Z}
\value ..... 1812
\vbox ..... 572, 983,
                              \z@ . . . . . 315, 319, 455,
       2269, 2454, 2463,
                                     475, 507, 517, 532,
```