Lass for the Association for Computing Machinery*

Boris Veytsman † 2024/02/04, v2.03

Abstract

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

Contents

1	Introduction					
2	User's guide					
	2.1	Installation	3			
	2.2	Invocation and options	6			
	2.3	Top matter	9			
	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	Note about anonymous mode	24			
	2.13	Acknowledgments	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				
		Creative Commons licenses for ACM publications				
		Disabled or forbidden commands				
		Notes for wizards				

 $^{^*}$ ©2016–2023, Association for Computing Machinery

[†]borisv@lk.net,boris@varphi.com

	2.21	Currently supported publications
	2.22	Samples
	2.23	A note about sigchi-a format
3	Imp	lementation 36
	3.1	Identification
	3.2	Preload hook
	3.3	Options
	3.4	Setting switches
	3.5	Loading the base class and package 41
	3.6	Citations
	3.7	Internationalization
	3.8	Sectioning
	3.9	Hyperxmp and hyperref
	3.10	Other packages
	3.11	Paper size and paragraphing
	3.12	Fonts
	3.13	Image descriptions
	3.14	Floats
	3.15	Lists
	3.16	Top-matter data
	3.17	Concepts system
	3.18	Copyright system
	3.19	Maketitle hook
	3.20	ACM Engage top matter
	3.21	Typesetting top matter
	3.22	Headers and Footers
	3.23	Sectioning
	3.24	TOC lists
	3.25	Theorems
	3.26	Balancing columns
	3.27	Acknowledgments
	3.28	Conditional typesetting
	3.29	Additional bibliography commands
	3.30	Index
	3 31	End of Class

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.

Sometimes conference proceedings are published as a special issue (or issues) of an ACM journal. In this case, you should use the journal format. The templates sample-acmsmall-conf.tex and sample-acmtog-conf.tex show how to enter conference information. Note that you need to comment out \acmJournal{...} line for such papers to get the conference information in the footers and headers.

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 2.23). 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 BibT_EX style is based on natbib. In most cases you do not need to set it. See Section 2.14.

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 anonymous is used for anonymous review processes and causes all author information to be obscured.

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.

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

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. 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 $\armontomath{\armontenant{acmJournal}{\langle shortName\rangle}}$ 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.

In most cases, conference proceedings are edited. You can use the command \editor 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{...}
\operatorname{\ \ }
```

Do not use the LTFX \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

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{...}
\operatorname{\colong}
\affiliation{...}
\affiliation{...}
\operatorname{\ \ }
```

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

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

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

However, this format is not generally recommended.

\additionalaffiliation

In some cases, too many affiliations can take too much space. The command $\additionalaffiliation{\affiliati$

```
\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \institution{The Th{\o}rv{\"a}ld 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

The \affiliation and \additionalaffiliation 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 \streetaddress and \country macros to indicate the corresponding parts of the affiliation. Note that in \city some cases (for example, journals) these parts are not printed in the resulting copy, but \state they are necessary since they are used by the XML metadata extraction programs. Do \postcode not put commas or \\ between the elements of \affiliation. They will be provided \country 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}
  \citv{Sidnev}
  \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

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 MTFX typesets them itself using the information you give it. However, you can override its choice using the commmand \authorsaddresses{\(\langle\) contact addresses\(\rangle\)}, 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

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,

\acmMonth \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:

```
\acmArticle{39}
                % The sequence number will be 39 by default
\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 $\acmission (ISBN)$ 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 $\startPage{\langle page \rangle}$ sets the first page of the article in a journal or book. It is used by the typesetter.

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.

2.22 Samples

There are several samples of acmart documents, that can serve as templates for the authors. Among them sample-sig... are templates for conference papers, while sample-acm... are templates for journal articles and special materials.

Here is the list of the samples:

sample-manuscript: A proceedings paper in the manuscript format.

sample-acmsmall: A journal paper in the acmsmall format.

sample-acmsmall-biblatex: A journal paper using experimental *biblatex* bibliography processing.

sample-acmlarge: A journal paper in the acmlarge format.

 $\boldsymbol{sample\text{-}acmtog:}\ A$ journal paper in the $\mathsf{acmtog}\ format.$

sample-sigconf: A proceedings paper in the standard sigconf format.

sample-sigconf-biblatex: A proceedings paper in the sigconf format using experimental biblatex bibliography processing.

sample-sigconf-authordraft: A proceedings paper in the sigconf format with the authordraft option selected.

sample-sigconf-i13n: A proceedings paper in the sigconf format with multilanguage titles and abstract.

sample-sigconf-xelatex: A proceedings paper in the sigconf format, XelfTeX ver-

sample-sigconf-lualatex: A proceedings paper in the sigconf format, Lual/TEX ver-

sample-sigplan: A proceedings paper in the sigplan format.

sample-acmsmall-conf: A proceedings paper in the acmsmall format for the publication in a journal using this option.

sample-acmtog-conf: A proceedings paper in the acmtog format for the publication in a journal using this option.

sample-acmcp: A sample of ACM Cover Page used by JDS.

sample-acmengage: A sample of ACM Engage publication.

2.23 A note about sigchi-a format

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:

figure: \columnwidth,

marginfigure: \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} [2024/02/04 v2.03 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

194 template call.}

```
\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@journal@bibstrip@or@tog ACM TOG sometimes uses journal-like bibstrip even for conference proceedings, so we
                                 need to set it separately
                                 165 \newif\if@ACM@journal@bibstrip@or@tog
            \if@ACM@sigchiamode The formatting of SIGCHI extended abstracts is quite unusual. We have a special switch
                                 for them.
                                 166 \newif\if@ACM@sigchiamode
                 \if@ACM@engage ACM Engage course materials have special formatting
                                 167 \newif\if@ACM@engage
                                 168 \@ACM@engagefalse
                  \if@ACM@acmcp ACM cover page formatting
                                 169 \newif\if@ACM@acmcp
                                 170 \@ACM@acmcpfalse
                                    Setting up switches
                                 171 \ifnum\ACM@format@nr=5\relax % siggraph
                                 172 \ClassWarning{\@classname}{%
                                      The format siggraph is now obsolete.\MessageBreak
                                      I am switching to sigconf.}
                                 174
                                      \setkeys{acmart.cls}{format=sigconf}
                                 175
                                 176 \fi
                                 177 \ifnum\ACM@format@nr=7\relax % sigchi
                                 178 \ClassWarning{\@classname}{%
                                      The format sigchi is now obsolete.\MessageBreak
                                 179
                                      I am switching to sigconf.}
                                 180
                                      \setkeys{acmart.cls}{format=sigconf}
                                 181
                                 182 \fi
                                 183 \ifnum\ACM@format@nr=8\relax % sigchi
                                 184 \ClassWarning{\@classname}{%
                                 185 ACM SIGCHI has retired the SIGCHI-A template\MessageBreak
                                      effective immediately. ACM is keeping this template\MessageBreak
                                 186
                                 option available to authors who are working on legacy\MessageBreak
                                 documents only. ACM will not, under any circumstances,\MessageBreak
                                 189 accept documents in this format for publication and\MessageBreak
                                 will not offer technical support to the authors who use\MessageBreak
                                 191 this template.\MessageBreak
                                 192 ACM SIGCHI is directing Conference leaders and\MessageBreak
                                 authors to publish their articles using the SIGCONF\MessageBreak
```

```
195 \fi
196 \ifnum\ACM@format@nr=0\relax
    \@ACM@manuscripttrue
198 \else
    \@ACM@manuscriptfalse
200\fi
201 \@ACM@sigchiamodefalse
202 \ifcase\ACM@format@nr
203 \relax % manuscript
204 \@ACM@journaltrue
205 \or % acmsmall
206 \@ACM@journaltrue
207 \or % acmlarge
208 \@ACM@journaltrue
209 \or % acmtog
    \@ACM@journaltrue
210
    \@ACM@journal@bibstrip@or@togtrue
212 \or % sigconf
213 \@ACM@journalfalse
214 \or % siggraph
215 \@ACM@journalfalse
216 \or % sigplan
217 \@ACM@journalfalse
218 \or % sigchi
219 \@ACM@journalfalse
220 \or % sigchi-a
221 \@ACM@journalfalse
222 \@ACM@sigchiamodetrue
223 \or % acmengage
224 \@ACM@journalfalse
225 \@ACM@engagetrue
226 \or % acmcp
227 \@ACM@journaltrue
   \@ACM@acmcptrue
228
    \AtBeginDocument{\@ACM@printacmreffalse}%
229
230 \fi
231 \if@ACM@journal
    \@ACM@journal@bibstriptrue
    \@ACM@journal@bibstrip@or@togtrue
234 \else
235 \@ACM@journal@bibstripfalse
236 \fi
```

3.5 Loading the base class and package

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

```
237\ifx\ACM@fontsize\@empty
238 \ifcase\ACM@format@nr
239 \relax % manuscript
240 \def\ACM@fontsize{9pt}%
241 \or % acmsmall
242 \def\ACM@fontsize{10pt}%
243 \or % acmlarge
244 \def\ACM@fontsize{10pt}%
```

```
245
                        \or % acmtog
                          \def\ACM@fontsize{9pt}%
                   246
                        \or % sigconf
                   247
                          \def\ACM@fontsize{9pt}%
                   248
                        \or % siggraph
                   249
                          \def\ACM@fontsize{9pt}%
                   250
                         \or % sigplan
                   251
                          \def\ACM@fontsize{10pt}%
                   252
                   253
                         \or % sigchi
                          \def\ACM@fontsize{9pt}%
                   254
                   255
                        \or % sigchi-a
                          \def\ACM@fontsize{10pt}%
                   256
                        \or % acmengage
                   257
                          \def\ACM@fontsize{10pt}%
                   258
                         \or % acmcp
                   259
                          \def\ACM@fontsize{9pt}%
                   260
                   261
                   262\fi
                   {\tt 263\ ClassInfo\{\ Classname\}\{Using\ fontsize\ \ ACM@fontsize\}}
                   264 \LoadClass[\ACM@fontsize, reqno]{amsart}
                   265 \RequirePackage{microtype}
                      We need etoolbox for delayed code
                   266 \RequirePackage{etoolbox}
                      Booktabs is now the default
                   267 \RequirePackage{booktabs}
                      We need totpages to calculate the number of pages and refcount to use that num-
                   ber
                   268 \RequirePackage{refcount}
                   269 \RequirePackage{totpages}
                      The \collect@body macro in amsmath is defined using \def. We load environ to
                   access the \long version of this command
                   270 \RequirePackage{environ}
                      We use setspace for double spacing
                   271 \if@ACM@manuscript
                   272 \RequirePackage{setspace}
                   273 \onehalfspacing
                   274 \fi
                      We need textcase for better upcasing
                   275 \RequirePackage{textcase}
                   276 \if@ACM@acmcp
                   277 \RequirePackage{framed}
                   278 \RequirePackage{zref-savepos, zref-user}
\@ACM@acmcp@delta We need to store the dimen to store the insert length of amcp box
                   280 \newdimen\@ACM@acmcp@delta
                   281 \@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.

```
282 \if@ACM@natbib
    \RequirePackage{natbib}
283
    \renewcommand{\bibsection}{%
284
        \section*{\refname}%
285
        \phantomsection\addcontentsline{toc}{section}{\refname}%
286
287
    }
    \renewcommand{\bibfont}{\bibliofont}
288
    \renewcommand\setcitestyle[1]{
289
    \@for\@tempa:=#1\do
290
    {\def\@tempb{round}\ifx\@tempa\@tempb
291
        \renewcommand\NAT@open{(}\renewcommand\NAT@close{)}\fi
292
      \def\@tempb{square}\ifx\@tempa\@tempb
293
        \renewcommand\NAT@open{[}\renewcommand\NAT@close{]}\fi
294
      \def\@tempb{angle}\ifx\@tempa\@tempb
295
       \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
296
      \def\@tempb{curly}\ifx\@tempa\@tempb
       298
299
     \def\@tempb{semicolon}\ifx\@tempa\@tempb
        \renewcommand\NAT@sep{;}\fi
300
301
     \def\@tempb{colon}\ifx\@tempa\@tempb
       \renewcommand\NAT@sep{;}\fi
302
303
      \def\@tempb{comma}\ifx\@tempa\@tempb
304
        \renewcommand\NAT@sep{,}\fi
305
      \def\@tempb{authoryear}\ifx\@tempa\@tempb
306
        \NAT@numbersfalse\fi
307
     \def\@tempb{numbers}\ifx\@tempa\@tempb
308
        \NAT@numberstrue\NAT@superfalse\fi
309
     \def\@tempb{super}\ifx\@tempa\@tempb
       \verb|\NAT@numberstrue| NAT@supertrue| fi
310
311
     \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
       \let\bibstyle=\@gobble\fi
312
     \def\@tempb{bibstyle}\ifx\@tempa\@tempb
313
       \let\bibstyle=\@citestyle\fi
314
      \def\@tempb{sort}\ifx\@tempa\@tempb
315
316
       \def\NAT@sort{\@ne}\fi
317
     \def\@tempb{nosort}\ifx\@tempa\@tempb
318
       \def\NAT@sort{\z@}\fi
     \def\@tempb{compress}\ifx\@tempa\@tempb
319
320
        \def\NAT@cmprs{\@ne}\fi
     \def\@tempb{nocompress}\ifx\@tempa\@tempb
321
        \def\NAT@cmprs{\z@}\fi
322
     \def\@tempb{sort&compress}\ifx\@tempa\@tempb
323
        \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
324
325
     \def\@tempb{mcite}\ifx\@tempa\@tempb
326
        \let\NAT@merge\@ne\fi
327
     \def\@tempb{merge}\ifx\@tempa\@tempb
328
        \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}{}\fi
329
     \def\@tempb{elide}\ifx\@tempa\@tempb
330
        \@ifnum{\NAT@merge<\thr@@}{\let\NAT@merge\thr@@}{}\fi
331
     \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
```

```
\NAT@longnamestrue\fi
                          332
                                \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
                          333
                                  \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
                          334
                                \expandafter\NAT@find@eq\@tempa=\relax\@nil
                          335
                                \if\@tempc\relax\else
                          336
                                  \expandafter\NAT@rem@eq\@tempc
                          337
                                  \def\@tempb{open}\ifx\@tempa\@tempb
                          338
                          339
                                   \xdef\NAT@open{\@tempc}\fi
                                  \def\@tempb{close}\ifx\@tempa\@tempb
                          340
                                   \xdef\NAT@close{\@tempc}\fi
                          341
                                  \def\@tempb{aysep}\ifx\@tempa\@tempb
                          342
                                   \xdef\NAT@aysep{\@tempc}\fi
                          343
                                  \def\@tempb{yysep}\ifx\@tempa\@tempb
                          344
                                   \xdef\NAT@yrsep{\@tempc}\fi
                          345
                                  \def\@tempb{notesep}\ifx\@tempa\@tempb
                          346
                                   \xdef\NAT@cmt{\@tempc}\fi
                          347
                                  \def\@tempb{citesep}\ifx\@tempa\@tempb
                          348
                          349
                                   \xdef\NAT@sep{\@tempc}\fi
                                \fi
                          350
                          351
                               }%
                               \NAT@@setcites
                          352
                          353
                               }
                               \renewcommand\citestyle[1]{%
                          354
                                 \ifcsname bibstyle@#1\endcsname%
                          355
                                 \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
                          356
                          357
                                 \@latex@error{Undefined '#1' citestyle}%
                          358
                                 \fi
                          360
                              }%
                          361\fi
\bibstyle@acmauthoryear The default author-year format:
                          362 \newcommand{\bibstyle@acmauthoryear}{%
                              \setcitestyle{%
                          364
                                 authoryear,%
                                 open={[},close={]},citesep={;},%
                          365
                                 aysep={},yysep={,},%
                          366
                                 notesep={, }}}
                          367
   \bibstyle@acmnumeric The default numeric format:
                          368 \newcommand{\bibstyle@acmnumeric}{%
                              \setcitestyle{%
                          369
                                 numbers,sort&compress,%
                          370
                          371
                                 open={[},close={]},citesep={,},%
                                 notesep={, }}}
                          372
                            The default is numeric:
                          373 \if@ACM@natbib
                          374 \citestyle{acmnumeric}
                          375 \fi
```

3.7 Internationalization

376 \if@ACM@journal

```
378 \else
                      \renewcommand\keywordsname{Keywords}%
                 379
                 380\fi
                 381 \if@ACM@engage
                       \renewcommand\abstractname{Synopsis}%
                 382
                 383 \fi
                 384 \ifx\ACM@languages\@empty
                 385 \else
                       \RequirePackage[\ACM@languages]{babel}%
                 386
                       \addto\captionsenglish{%
                 387
                           \if@ACM@journal
                 388
                             \renewcommand\keywordsname{Additional Key Words and Phrases}%
                 389
                           \else
                 390
                             \renewcommand\keywordsname{Keywords}%
                 391
                 392
                           \renewcommand\acksname{Acknowledgements}%
                 393
                           \if@ACM@engage
                              \renewcommand\abstractname{Synopsis}%
                 395
                 396
                           \fi
                      3%
                 397
                       \addto\captionsfrench{%
                 398
                           \if@ACM@journal
                 399
                             \renewcommand\keywordsname{Mots Clés et Phrases Supplémentaires}%
                 400
                 401
                             \renewcommand\keywordsname{Mots clés}%
                 402
                 403
                           \renewcommand\acksname{Remerciements}%
                 404
                      }%
                  405
                       \addto\captionsgerman{%
                 406
                           \if@ACM@journal
                 407
                             \renewcommand\keywordsname{Zusätzliche Schlagwörter und Phrasen}%
                  408
                           \else
                 409
                             \renewcommand\keywordsname{Schlagwörter}%
                 410
                 411
                           \renewcommand\acksname{Danksagungen}%
                 412
                      }%
                 413
                 414
                       \addto\captionsspanish{%
                 415
                           \if@ACM@journal
                             \renewcommand\keywordsname{Palabras y Frases Claves Adicionales}%
                 416
                 417
                           \else
                             \renewcommand\keywordsname{Palabras claves}%
                 418
                           \fi
                 419
                           \renewcommand\acksname{Expresiones de gratitud}%
                 420
                      }%
                 421
                 422\fi
\ACM@lang@check Some commands should not be used if the document is monlingual
                 423 \newcommand\ACM@lang@check[1]{%
                      \ifx\ACM@languages\@empty\relax
                 424
                       \ClassError{\@classname}{%
                 425
                        Command \string#1 \MessageBreak is used in monlingual document}{%
                  426
                        You used a command (\string#1) \MessageBreak
                  427
                        that does not have a meaning \MessageBreak
                 428
```

\renewcommand\keywordsname{Additional Key Words and Phrases}%

```
unless are languages are defined. \MessageBreak
                                                     429
                                                                  Please choose the languages in \string\documentclass
                                                     430
                                                                   \MessageBreak
                                                     431
                                                                   (e.g. \string\documentclass[languages={french, english}]{acmart}),
                                                     432
                                                                   \MessageBreak
                                                     433
                                                                  or delete the command.}%
                                                             \fi}
              \@translatedtitle
                                                     436 \def\@translatedtitle{}
                \translatedtitle The title of the paper in a different language
                                                     438 \end{distance} $$ \g@addto@macro\\@translatedtitle{\par\foreignlanguage{\#1}{\#2}} $$
        \@translatedsubtitle
                                                     439 \def\@translatedsubtitle{}
          \translatedsubtitle The subtitle of the paper in a different language
                                                     440 \newcommand \translated subtitle \cite{Command \translated} \newcommand \translated subtitle \cite{Command \translated} \newcommand \translated subtitle \cite{Command \translated} \newcommand \translated \newcommand \translated \newcommand \translated \newcommand 
                                                     441 \g@addto@macro\\etranslatedsubtitle{\par\foreignlanguage{#1}{#2}}}
        \@translatedkeywords
                                                     442 \def\@translatedkeywords{}
          \translatedkeywords Add keywords to the paper in the language specified
                                                     443 \newcommand\translatedkeywords[2]{\ACM@lang@check{\translatedkeywords}%
                                                     444 \g@addto@macro\@translatedkeywords{\@mktranslatedkeywords{#1}{#2}}}
      \@translatedabstracts The container for translated abstracts.
                                                     445 \def\@translatedabstracts{}
            translatedabstract We save translated abstracts into \@translatedabstracts
                                                     446 \newenvironment{translatedabstract}[1]{\Collect@Body
                                                              \@savetranslatedabstract\@mktranslatedabstract{#1}}{}
\@savetranslatedabstract And saving the abstract
                                                     448 \long\def\@savetranslatedabstract#1{\if@ACM@maketitle@typeset
                                                              \ClassError{\@classname}{Abstract must be defined before maketitle
                                                     449
                                                                   command. Please move it!}\fi
                                                     450
                                                               \ACM@lang@check{translatedabstract}%
                                                     451
                                                               \g@addto@macro\@translatedabstracts{\bgroup#1\egroup}}
                                                    3.8
                                                               Sectioning
                    \@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:
                                                     453 \def\@startsection#1#2#3#4#5#6{%
                                                     454 \if@noskipsec \leavevmode \fi
```

455

\@tempskipa #4\relax

```
\@afterindenttrue
457
     \ifdim \@tempskipa <\z@
458
       \@tempskipa -\@tempskipa \@afterindentfalse
459
460
     \if@nobreak
461
       \everypar{}%
462
463
       \addpenalty\@secpenalty\addvspace\@tempskipa
464
465
    \fi
     \@ifstar
466
       {\@ssect{#3}{#4}{#5}{#6}}%
467
       {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}}
468
469 \def\@sect#1#2#3#4#5#6[#7]#8{%
     \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
470
     \ifnum #2>\c@secnumdepth
471
       \let\@svsec\@empty
472
     \else
473
       \refstepcounter{#1}%
474
       \protected@edef\@svsec{\@seccntformat{#1}\relax}%
475
476
     \fi
     \@tempskipa #5\relax
477
     \ifdim \@tempskipa>\z@
478
       \begingroup
479
         #6{%
480
           \@hangfrom{\hskip #3\relax\@svsec}%
481
             \interlinepenalty \@M #8\@@par}%
482
       \endgroup
483
       \csname #1mark\endcsname{#7}%
484
       \ifnum #2>\c@secnumdepth \else
485
           \@tochangmeasure{\csname the#1\endcsname}%
486
       \fi
487
       \addcontentsline{toc}{#1}{%
488
489
         \ifnum #2>\c@secnumdepth \else
           \protect\numberline{\csname the#1\endcsname}%
490
491
         #7}%
492
     \else
493
494
       \def\ensuremath{\sc 0}
495
         #6{\hskip #3\relax
496
         \@svsec #8}%
497
         \csname #1mark\endcsname{#7}%
498
         \ifnum #2>\c@secnumdepth \else
           \@tochangmeasure{\csname the#1\endcsname\space}%
499
         \fi
500
         \addcontentsline{toc}{#1}{%
501
           \ifnum #2>\c@secnumdepth \else
502
             \protect\numberline{\csname the#1\endcsname}%
503
           \fi
504
           #7}}%
505
506
    \fi
507
    \@xsect{#5}}
508 \def\@xsect#1{%
    \@tempskipa #1\relax
509
    \ifdim \@tempskipa>\z@
510
```

```
\par \nobreak
                 511
                        \vskip \@tempskipa
                 512
                        \@afterheading
                 513
                      \else
                 514
                        \@nobreakfalse
                 515
                        \global\@noskipsectrue
                 516
                        \everypar{%
                 517
                          \if@noskipsec
                 518
                            \global\@noskipsecfalse
                 519
                           {\setbox\z@\lastbox}%
                 520
                            \clubpenalty\@M
                 521
                            \begingroup \@svsechd \endgroup
                 522
                            \unskip
                 523
                            \@tempskipa #1\relax
                 524
                            \hskip -\@tempskipa
                 525
                          \else
                 526
                             \clubpenalty \@clubpenalty
                 527
                            \everypar{}%
                 529
                          \fi}%
                      \fi
                 530
                      \ignorespaces}
                 531
                 532 \def\@seccntformat#1{\csname the#1\endcsname\quad}
                 533 \def\@ssect#1#2#3#4#5{%
                      \@tempskipa #3\relax
                 534
                      \ifdim \@tempskipa>\z@
                 535
                 536
                        \begingroup
                 537
                             \@hangfrom{\hskip #1}%
                 538
                 539
                               \interlinepenalty \@M #5\@@par}%
                        \endgroup
                 540
                      \else
                 541
                        \def\@svsechd{#4{\hskip #1\relax #5}}%
                 542
                      \fi
                 543
                      \@xsect{#3}}
\@startsection The amsart package redefines \startsection. Here we redefine it again to make the
                table of contents work.
                 545 \def\@starttoc#1#2{\begingroup\makeatletter
                      \setTrue{#1}%
                      \par\removelastskip\vskip\z@skip
                 547
                     \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
                 548
                        {\tt \{.5\linespacing\}\{\centering\contentsnamefont\}\{\#2\}\%}
                 549
                      \@input{\jobname.#1}%
                 550
                      \if@filesw
                 551
                        \@xp\newwrite\csname tf@#1\endcsname
                 552
                        \immediate\@xp\openout\csname tf@#1\endcsname \jobname.#1\relax
                 553
                 554
                      \global\@nobreakfalse \endgroup
                 555
                      \addvspace{32\p@\ensuremath{0}\pus14\p@}%
                 556
                 557 }
 \l@subsection Section spacing is more generous than for amsart
                 \label{lem:signal_signal} $$ \def\leq \frac{1}{0pt}{1pc}{2pc}{} $$
```

```
\l@subsection The spacing in amsart is too large
                  \label{lem:condition} $$ \operatorname{l@subsection}(\etocline{2}{0pt}{1pc}{3pc}{}) $$
\lesubsubsection The spacing in amsart is too large
                  560 \def\l@subsubsection{\@tocline{3}{0pt}{1pc}{5pc}{}}
                     We need to define foonote-related stuff before the call to hyperref (Ross Moore)
    \@makefntext We do not use indentation for footnotes
                  561 \def\@makefntext{\noindent\@makefnmark}
  \@footnotetext In sigchi-a mode our footnotes are in the margin!
                  562 \if@ACM@sigchiamode
                  563 \long\def\@footnotetext#1{\marginpar{%
                          \reset@font\small
                  564
                          \interlinepenalty\interfootnotelinepenalty
                  565
                          \protected@edef\@currentlabel{%
                  566
                   567
                             \csname p@footnote\endcsname\@thefnmark
                   568
                         }%
                   569
                          \color@begingroup
                  570
                            \@makefntext{%
                              \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
                  571
                          \color@endgroup}}%
                  572
                  573 \fi
\@mpfootnotetext We want the footnotes in minipages centered:
                  574 \long\def\@mpfootnotetext#1{%
                       \global\setbox\@mpfootins\vbox{%
                         \unvbox\@mpfootins
                  576
                          \reset@font\footnotesize
                  577
                         \hsize\columnwidth
                  578
                         \@parboxrestore
                  579
                          \protected@edef\@currentlabel
                  580
                               {\csname p@mpfootnote\endcsname\@thefnmark}%
                  581
                  582
                          \color@begingroup\centering
                  583
                            \@makefntext{%
                              \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
                   584
                  585
                          \color@endgroup}}
    \@makefnmark AMS classes use a buggy definition of \makefnmark. We revert to the standard one.
                  586 \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}
                  3.9 Hyperxmp and hyperref
                  Adding hyperref
                  587 \let\@footnotemark@nolink\@footnotemark
                  588 \let\@footnotetext@nolink\@footnotetext
                  589 \RequirePackage[bookmarksnumbered,unicode]{hyperref}
                  590 \RequirePackage{hyperxmp}
                  591 \pdfstringdefDisableCommands{%
                  592 \def\addtocounter#1#2{}%
                       \def\unskip{}%
```

\def\textbullet{- }%

```
\def\textrightarrow{ -> }%
595
     \def\footnotemark{}%
596
597 }
598 \urlstyle{rm}
599 \ifcase\ACM@format@nr
600 \relax % manuscript
601 \or % acmsmall
602 \or % acmlarge
603 \or % acmtog
604\or % sigconf
605 \or % siggraph
606 \or % sigplan
607
   \urlstyle{sf}
608 \or % sigchi
609 \or % sigchi-a
610
    \urlstyle{sf}
611 \or % acmengage
612 \or % acmcp
613 \fi
614 \AtEndPreamble{%
    \if@ACM@urlbreakonhyphens
615
       \def\do@url@hyp{\do\-}%
616
617
     \if@ACM@screen
618
       \hypersetup{colorlinks,
619
         linkcolor=ACMPurple,
620
         citecolor=ACMPurple,
621
         urlcolor=ACMDarkBlue,
622
623
         filecolor=ACMDarkBlue}
624
       \else
       \hypersetup{hidelinks}
625
    \fi
626
     \hypersetup{pdflang={en},
627
       pdfdisplaydoctitle}}
628
  Bibliography mangling.
629 \if@ACM@natbib
    \let\citeN\cite
630
     \let\cite\citep
631
     \let\citeANP\citeauthor
632
     \let\citeNN\citeyearpar
633
     \let\citeyearNP\citeyear
634
635
     \let\citeNP\citealt
     \DeclareRobustCommand\citeA
636
        {\begingroup\NAT@swafalse
637
          \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
638
    \providecommand\newblock{}%
639
640 \else
     \AtBeginDocument{%
641
       \let\shortcite\cite%
642
       \providecommand\citename[1]{#1}}
643
644\fi
645 \newcommand\shortcite[2][]{%
   \ifNAT@numbers\cite[#1]{#2}\else\citeyearpar[#1]{#2}\fi}
```

\bibliographystyle The amsart package redefines \bibliographystyle since it prefers the AMS bibliography style. We turn it back to the Lagrangian.

```
647\def\bibliographystyle#1{%
648 \ifx\@begindocumenthook\@undefined\else
649 \expandafter\AtBeginDocument
650 \fi
651 {\if@filesw
652 \immediate\write\@auxout{\string\bibstyle{#1}}%
653 \fi}}
```

3.10 Other packages

```
Graphics and color.
```

```
654 \RequirePackage{graphicx}
655 \RequirePackage[prologue]{xcolor}
  We define ACM colors according to [8]:
656 \definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
657 \definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
658 \definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
{\tt 659 \backslash definecolor[named]{ACMRed}{cmyk}{\emptyset,0.90,0.86,0}}
{\tt 660 \backslash definecolor[named]{ACMLightBlue}{cmyk}{\tt \{0.49,0.01,0,0\}}}
\label{lem:color_named} $$ 661 \end{color[named]_{ACMGreen}_{cmyk}_{0.20,0,1,0.19}} $$
662 \definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
Author-draft mode or sigchi-a mode
664 \if@ACM@authordraft
665
    \RequirePackage{draftwatermark}
    \SetWatermarkFontSize{0.5in}
666
     \SetWatermarkColor[gray]{.9}
667
     \SetWatermarkText{\parbox{12em}{\centering}
668
         Unpublished working draft.\\
669
         Not for distribution.}}
670
671 \else
    \if@ACM@sigchiamode
672
       \if@ACM@nonacm\else
673
         \RequirePackage{draftwatermark}
674
         \SetWatermarkFontSize{0.5in}
675
         \SetWatermarkColor[gray]{.9}
676
         \SetWatermarkText{\parbox{12em}{\centering
677
             Legacy document. \\
678
             Not for publication in an ACM venue}}
       \fi
    \fi
681
682\fi
```

3.11 Paper size and paragraphing

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.

```
683 \RequirePackage{geometry}
```

```
684 \ifcase\ACM@format@nr
685 \relax % manuscript
      \geometry{letterpaper,head=13pt,
686
     marginparwidth=6pc,heightrounded}%
687
688 \or % acmsmall
      \geometry{twoside=true,
689
        includeheadfoot, head=13pt, foot=2pc,
690
        paperwidth=6.75in, paperheight=10in,
691
        top=58pt, bottom=44pt, inner=46pt, outer=46pt,
692
        marginparwidth=2pc,heightrounded
693
694
     }%
695 \or % acmlarge
      \geometry{twoside=true, head=13pt, foot=2pc,
696
        paperwidth=8.5in, paperheight=11in,
697
        includeheadfoot,
698
        top=78pt, bottom=114pt, inner=81pt, outer=81pt,
699
        marginparwidth=4pc, heightrounded
700
        }%
701
702 \or % acmtog
      \geometry{twoside=true, head=13pt, foot=2pc,
703
        paperwidth=8.5in, paperheight=11in,
704
        includeheadfoot, columnsep=24pt,
705
        top=52pt, bottom=75pt, inner=52pt, outer=52pt,
706
        marginparwidth=2pc,heightrounded
707
708
        }%
709 \or % sigconf
      \geometry{twoside=true, head=13pt,
710
        paperwidth=8.5in, paperheight=11in,
711
        includeheadfoot, columnsep=2pc,
712
        top=57pt, bottom=73pt, inner=54pt, outer=54pt,
713
        marginparwidth=2pc,heightrounded
714
715
        }%
716 \or % siggraph
      \geometry{twoside=true, head=13pt,
717
        paperwidth=8.5in, paperheight=11in,
718
        includeheadfoot, columnsep=2pc,
719
        top=57pt, bottom=73pt, inner=54pt, outer=54pt,
720
        marginparwidth=2pc,heightrounded
        }%
723 \or % sigplan
      \geometry{twoside=true, head=13pt,
724
725
        paperwidth=8.5in, paperheight=11in,
        includeheadfoot=false, columnsep=2pc,
726
        top=1in, bottom=1in, inner=0.75in, outer=0.75in,
727
        marginparwidth=2pc,heightrounded
728
        }%
729
730 \or % sigchi
      \geometry{twoside=true, head=13pt,
731
        paperwidth=8.5in, paperheight=11in,
732
733
        includeheadfoot, columnsep=2pc,
734
        top=66pt, bottom=73pt, inner=54pt, outer=54pt,
735
        marginparwidth=2pc,heightrounded
       }%
736
737 \or % sigchi-a
```

```
\geometry{twoside=false, head=13pt,
            738
                    paperwidth=11in, paperheight=8.5in,
            739
                    includeheadfoot, marginparsep=72pt,
            740
                    marginparwidth=170pt, columnsep=20pt,
            741
                    top=72pt, bottom=72pt, left=314pt, right=72pt
            742
            743
                    \@mparswitchfalse
            744
                    \reversemarginpar
            745
            746 \or % acmengage
                  \geometry{twoside=true, head=13pt,
            747
                    paperwidth=8.5in, paperheight=11in,
            748
                    includeheadfoot, columnsep=2pc,
            749
                    top=57pt, bottom=73pt, inner=54pt, outer=54pt,
            750
                    marginparwidth=2pc, heightrounded
            751
                    }%
            752
            753 \or % acmcp
                  \geometry{twoside=true,
            754
                    includeheadfoot, head=13pt, foot=2pc,
            755
            756
                    paperwidth=6.75in, paperheight=10in,
                    top=58pt, bottom=44pt, inner=46pt, outer=46pt,
            757
                    marginparwidth=2pc,heightrounded
            758
                  }%
            759
            760\fi
\parindent Paragraphing
 \parskip 761 \setlength \parindent{10pe}
            762 \setlength\parskip{\z@}
            763 \ifcase\ACM@format@nr
            764 \relax % manuscript
            765 \or % acmsmall
            766 \or % acmlarge
            767 \or % acmtog
            768 \setlength\parindent{9\p@}%
            769 \or % sigconf
            770 \or % siggraph
            771 \or % sigplan
            772 \or % sigchi
            773 \or % sigchi-a
            774 \or % acmengage
            775 \or % acmcp
            776\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.

```
777 \setlength\normalparindent{\parindent}
```

Footnotes require some consideration. We have several layers of footnotes: frontmatter 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.
                                   778 \def\copyrightpermissionfootnoterule{\kern-3\p@
                                       \hrule \@width \columnwidth \kern 2.6\p@}
                                   780 \RequirePackage{manyfoot}
                                   781 \SelectFootnoteRule[2]{copyrightpermission}
                                   782 \DeclareNewFootnote{authorsaddresses}
                                   783 \SelectFootnoteRule[2]{copyrightpermission}
                                   784 \DeclareNewFootnote{copyrightpermission}
                   \footnoterule Tschichold's rules:
                                   785 \def\footnoterule{\kern-3\p@
                                   786 \hrule \@width 4pc \kern 2.6\p@}
                    \endminipage We do not use footnote rules in minipages
                                   787 \def\endminipage{%
                                          \par
                                   789
                                          \unskip
                                          \ifvoid\ensuremath{\verb{@mpfootins}}
                                   790
                                            \vskip\skip\@mpfootins
                                   791
                                            \normalcolor
                                   792
                                            \unvbox\@mpfootins
                                   793
                                          \fi
                                   794
                                          \@minipagefalse
                                   795
                                       \color@endgroup
                                   796
                                   797
                                        \egroup
                                        \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
                                   798
                    \@textbottom Add some stretch according to David Carlisle's advice at http://tex.stackexchange.
                                  com/a/62318/5522
                                   799 \def\@textbottom{\vskip \z@ \@plus 1pt}
                                   800 \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.
                                   801 \ifcase\ACM@format@nr
                                   802 \relax % manuscript
                                   803 \or % acmsmall
                                   804 \or % acmlarge
                                   805 \or % acmtog
                                   806 \flushbottom
                                   807 \or % sigconf
                                   808 \flushbottom
                                   809 \or % siggraph
                                   810 \flushbottom
                                   811 \or % sigplan
                                   812 \flushbottom
                                   813 \or % sigchi
```

814 \flushbottom
815 \or % sigchi-a
816 \or % acmengage
817 \flushbottom

```
818 or % acmcp
819 \flushbottom
820 \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.
                  821 \ifPDFTeX
                  822 \input{glyphtounicode}
                  823 \pdfglyphtounicode{f_f}{FB00}
                  824 \pdfglyphtounicode{f_f_i}{FB03}
                  825 \pdfglyphtounicode{f_f_l}{FB04}
                  826 \pdfglyphtounicode{f_i}{FB01}
                  827 \pdfglyphtounicode{t_t}{0074 0074}
                  828 \pdfglyphtounicode{f_t}{0066 0074}
                  829 \pdfglyphtounicode{T_h}{0054 0068}
                  830 \pdfgentounicode=1
                  831 \RequirePackage{cmap}
                  832 \fi
\if@ACM@newfonts Whether we load the new fonts
                  833 \newif\if@ACM@newfonts
                  834 \@ACM@newfontstrue
                  {\tt 835 \libertine.sty}{}{\classWarning{\classname}{\c Monotone}} \\
                         have the libertine package installed. Please upgrade your
                  836
                         TeX}\@ACM@newfontsfalse}
                  837
                  838 \IfFileExists{zi4.sty}{}{\ClassWarning{\@classname}{You do not
                         have the inconsolata (zi4.sty) package installed. Please upgrade your
                  839
                         TeX}\@ACM@newfontsfalse}
                  841 \ TFileExists{newtxmath.sty}{}{\ ClassWarning{\ Qclassname}}{\ You\ do\ not\ }
                         have the newtxmath package installed. Please upgrade your
                         TeX}\@ACM@newfontsfalse}
                  843
                     We use Libertine throughout.
                  844 \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
849
850
    \ifxetex
       \RequirePackage[libertine]{newtxmath}
851
       \RequirePackage[tt=false]{libertine}
852
       \setmonofont[StylisticSet=3]{inconsolata}
853
     \else
854
855
       \ifluatex
856
         \RequirePackage[libertine]{newtxmath}
857
         \RequirePackage[tt=false]{libertine}
858
         \setmonofont[StylisticSet=3]{inconsolata}
859
       \else
          \RequirePackage[tt=false, type1=true]{libertine}
860
```

```
\RequirePackage[libertine]{newtxmath}
                                                                                                                  862
                                                                                                                                                 \fi
                                                                                                                  863
                                                                                                                                      \fi
                                                                                                                  864
                                                                                                                  865 \fi
                                                       \liningnums Libertine defines \liningnums, which makes fontspec unhappy. While we do not use
                                                                                                               fontspec, some users do.
                                                                                                                  866 \let\liningnums\@undefined
                                                                                                                  867 \AtEndPreamble{%
                                                                                                                                     \DeclareTextFontCommand{\liningnums}{\libertineLF}}
                                                                                                                              The SIGCHI extended abstracts are sans serif:
                                                                                                                  869 \if@ACM@sigchiamode
                                                                                                                  870 \renewcommand{\familydefault}{\sfdefault}
                                                                                                                  871\fi
                                                                                                               3.13
                                                                                                                                               Image descriptions
\if@Description@present A local switch: whether there is a description in the given figure
                                                                                                                  872 \newif\if@Description@present
                                                                                                                  873 \@Description@presenttrue
     \if@undescribed@images A global switch whether some images were not described
                                                                                                                  874 \newif\if@undescribed@images
                                                                                                                  875 \@undescribed@imagesfalse
                                                  \Description The Description macro right now just sets switches
                                                                                                                  876 \newcommand \Description \[2][] \global \@Description \@presenttrue \ignorespaces \}
                                                                                                                              The global warning
                                                                                                                  877 \AtEndDocument{\if@undescribed@images
                                                                                                                                     \ClassWarningNoLine{\@classname}{Some images may lack descriptions}\fi}
                                                                                                                              Hooks for figures and tables. We also patch algorithm and algorithm* in case
                                                                                                               somebody uses them.
                                                                                                                  879 \AtBeginEnvironment{figure}{\@Description@presentfalse
                                                                                                                                   \let\@vspace\@vspace@orig
                                                                                                                                     \let\@vspacer\@vspacer@orig}
                                                                                                                  882 \label{lem:eq:loss} $82 \Delta \theta = \frac{1}{2} \end{supersemble} $$ 882 \Delta \theta = \frac{1}{2} \end{supersem
                                                                                                                                \let\@vspace\@vspace@orig
                                                                                                                  883
                                                                                                                  884 \let\@vspacer\@vspacer@orig}
                                                                                                                  885 \AtEndEnvironment{figure}{\if@Description@present\else
                                                                                                                                       \global\@undescribed@imagestrue
                                                                                                                  886
                                                                                                                                      \ClassWarning{\@classname}{A possible image without description}\fi}
                                                                                                                  887
                                                                                                                  888 \ AtEndEnvironment \{figure*\} \{ \ if @Description @present \ else \ and \ else \ else \ and \ else \ e
                                                                                                                                       \global\@undescribed@imagestrue
                                                                                                                                       891 \AtBeginEnvironment{table}{\let\@vspace\@vspace@orig
                                                                                                                  892 \let\@vspacer\@vspacer@orig}
                                                                                                                  893 \added{AtBeginEnvironment{table*}{\let\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@vspace\@
                                                                                                                                    \let\@vspacer\@vspacer@orig}
                                                                                                                  895 \AtBeginEnvironment{algorithm}{\let\@vspace\@vspace@orig
```

\RequirePackage[varqu]{zi4}

```
\let\@vspacer\@vspacer@orig}
897 \label{lem:solution} 897 \added \adjusted \adjuste
                 \let\@vspacer\@vspacer@orig}
899 \AtBeginEnvironment{lstlisting}{\let\@vspace\@vspace@orig
                  \let\@vspacer\@vspacer@orig}
901 \AtBeginEnvironment{lstlisting*}{\let\@vspace\@vspace@orig
                  \let\@vspacer\@vspacer@orig}
903 \AtBeginEnvironment{minted}{\let\@vspace\@vspace@orig
                  \let\@vspacer\@vspacer@orig}
905 \AtBeginEnvironment{minted*}{\let\@vspace\@vspace@orig
                  \let\@vspacer\@vspacer@orig}
906
907 \AtBeginEnvironment{listing}{\let\@vspace\@vspace@orig
                  \let\@vspacer\@vspacer@orig}
908
909 \AtBeginEnvironment{listing*}{\let\@vspace\@vspace@orig
                  \let\@vspacer\@vspacer@orig}
911
```

3.14 Floats

We use the caption package

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

```
sidebar The sidebar environment:
                946 \newfloat{sidebar}{}{sbar}
                947 \floatname{sidebar}{Sidebar}
                948 \renewenvironment{sidebar}{\Collect@Body\@sidebar}{}
     \@sidebar The processing of the saved text
                949 \long\def\@sidebar#1{\bgroup\let\@vspace\@vspace@orig
                950 \let\@vspacer\@vspacer@orig\captionsetup{type=sidebar}%
                951 \marginpar{\small#1}\egroup}
  marginfigure The marginfigure environment:
                952 \newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}
\@marginfigure The processing of the saved text
                953 \long\def\@marginfigure#1{\bgroup
                    \let\@vspace\@vspace@orig
                     \let\@vspacer\@vspacer@orig
                     \captionsetup{type=figure}%
                     \marginpar{\@Description@presentfalse\centering
                957
                       \small#1\if@Description@present\else
                958
                         \global\@undescribed@imagestrue
                959
                         \ClassWarning{\@classname}{A possible image without description}
                960
                         \fi}%
                961
                     \egroup}
                962
   margintable The margintable environment:
                963 \newenvironment{margintable}{\Collect@Body\@margintable}{}
 \ensuremath{\verb{\ensuremath{$\backslash$}}} The processing of the saved text
                964 \long\def\@margintable#1{\bgroup\let\@vspace\@vspace@orig
                    \let\@vspacer\@vspacer@orig\captionsetup{type=table}%
                     \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
                967 \newdimen\fulltextwidth
                968 \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)
                969 \if@ACM@sigchiamode
                970 \def\@dblfloat{\bgroup\let\@vspace\@vspace@orig
                971 \let\@vspacer\@vspacer@orig\columnwidth=\fulltextwidth
                972 \let\@endfloatbox\@endwidefloatbox
                973 \def\@fpsadddefault{\def\@fps{tp}}%
                974 \@float}
                975 \fi
 \end@dblfloat And the end. Just adding a \bgroup.
                976 \if@ACM@sigchiamode
                977 \def\end@dblfloat{%
                978
                     \end@float\egroup}
                979 \fi
```

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

```
980 \def\@endwidefloatbox{%
    \par\vskip\z@skip
981
     \@minipagefalse
982
    \outer@nobreak
983
984
    \egroup
985
     \color@endbox
     \global\setbox\@currbox=\vbox{\moveleft
987
      \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
988
    \wd\@currbox=\textwidth
989 }
```

3.15 Lists

```
990 \ifcase\ACM@format@nr
991 \relax % manuscript
992 \or % acmsmall
993 \or % acmlarge
994 \or % acmtog
995 \or % sigconf
996 \or % siggraph
997 \or % sigplan
998 \def\labelenumi{\theenumi.}
999 \def\labelenumii{\theenumii.}
1000 \def\labelenumiii{\theenumiii.}
1001 \def\labelenumiv{\theenumiv.}
1002 \or % sigchi
1003 \or % sigchi-a
1004 \or % acmengage
1005 \or % acmcp
```

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.

```
1007 \newdimen\@ACM@labelwidth
1008 \AtBeginDocument{%
     \setlength\labelsep{4pt}
1009
     \setlength{\@ACM@labelwidth}{6.5pt}
1010
1011
     %% First-level list: when beginning after the first line of an
1012
     %% indented paragraph or ending before an indented paragraph, labels
     %% should not hang to the left of the preceding/following text.
1014
     \setlength\leftmargini{\z@}
1015
     \addtolength\leftmargini{\parindent}
1016
     \addtolength\leftmargini{2\labelsep}
1017
     \addtolength\leftmargini{\@ACM@labelwidth}
1018
1019
1020
     %% Second-level and higher lists.
     \setlength\leftmarginii{\z@}
1021
     \addtolength\leftmarginii{0.5\labelsep}
```

```
\addtolength\leftmarginii{\@ACM@labelwidth}
                           1023
                                \setlength\leftmarginiii{\leftmarginii}
                           1024
                                \setlength\leftmarginiv{\leftmarginiii}
                           1025
                                \setlength\leftmarginv{\leftmarginiv}
                           1026
                                \setlength\leftmarginvi{\leftmarginv}
                           1027
                                \@listi}
                           1029 \newskip\listisep
                           1030 \listisep\smallskipamount
                           1031 \def\@listI{\leftmargin\leftmargini
                                \labelwidth\leftmargini \advance\labelwidth-\labelsep
                                \listparindent\z@
                                \topsep\listisep}
                           1034
                           1035 \let\@listi\@listI
                           1036 \def\@listii{\leftmargin\leftmarginii
                                \labelwidth\leftmarginii \advance\labelwidth-\labelsep
                                \topsep\z@skip}
                           1038
                           1039 \def\@listiii{\leftmargin\leftmarginiii
                                \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
                           1041 \def\@listiv{\leftmargin\leftmarginiv
                                \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
                           1043 \def\@listv{\leftmargin\leftmarginv
                           1044 \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
                           1045 \def\@listvi{\leftmargin\leftmarginvi
                                \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
        \descriptionlabel We do not use a colon by default like amsart does:
                           1047 \renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}
             \description Make the description environment indentation consistent with that of the itemize
                           and enumerate environments.
                           1048 \renewenvironment{description}{\list{}{%
                                  \labelwidth\@ACM@labelwidth
                           1049
                                  \let\makelabel\descriptionlabel}%
                           1050
                           1051 }{
                                \endlist
                           1052
                           1053 }
                           1054 \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.

```
1055 \newif\if@ACM@maketitle@typeset
1056 \@ACM@maketitle@typesetfalse
```

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

1057 \define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%

```
1058 ACMJCSS,%
1059 CIE,%
1060 CSUR.%
1061 DGOV,%
1062 DLT,%
1063 DTRAP.%
1064 FAC,%
```

- GAMES,% 1065
- HEALTH,% 1066
- IMWUT,% 1067
- 1068 JACM,%
- JATS,% 1069
- 1070 JDIQ,%
- 1071 JDS,%
- JEA,% 1072
- JERIC,% 1073
- 1074 JETC,%
- JOCCH,% 1075
- JRC,% 1076
- PACMCGIT,% 1077
- PACMHCI,% 1078
- 1079 PACMMOD,%
- 1080 PACMNET,%
- 1081 PACMPL,%
- PACMSE,% 1082
- POMACS,% 1083
- TAAS,% 1084
- TACCESS,% 1085
- TACO,% 1086
- TALG,% 1087
- TALLIP,% 1088
- TAP,% 1089
- TCPS,% 1090
- TDS,% 1091
- TEAC,% 1092
- TECS,% 1093
- TELO,% 1094
- THRI,%
- 1095
- TIIS,% 1096 TIOT,% 1097
- 1098 TISSEC,%
- 1099 TIST,%
- 1100 TKDD,%
- 1101 TMIS,%
- 1102 TOCE,%
- TOCHI,% 1103
- TOCL,% 1104
- TOCS,% 1105
- TOCT,% 1106
- TODAES,% 1107
- TODS,% 1108
- TOG,% 1109
- TOIS,% 1110
- TOIT,% 1111 1112 TOMACS,%
- 1113 TOMM,%
- 1114 TOMPECS,%
- 1115 TOMS,%
- TOPC,% 1116
- TOPS,% 1117
- TOPLAS,% 1118

```
TOPML.%
1119
     TORS,%
1120
     TOS,%
1121
    TOSEM,%
1122
1123 TOSN,%
1124 TQC,%
1125 TRETS,%
    TSAS,%
    TSC,%
1127
    TSLP,%
1128
     TWEB.%
1129
     FACMP%
1130
1131 }{%
1132 \ifcase\@journalCode@nr
1133 \relax % ACMJCSS
     \def\@journalName{ACM Journal on Computing and Sustainable Societies}%
     \def\@journalNameShort{ACM J. Comput. Sustain. Soc.}%
     \def\@permissionCodeOne{2834-5533}%
1137 \or % CIE
1138
     \def\@journalName{ACM Computers in Entertainment}%
     \def\@journalNameShort{ACM Comput. Entertain.}%
1139
     \def\@permissionCodeOne{1544-3574}%
1140
1141 \or % CSUR
     \def\@journalName{ACM Computing Surveys}%
1142
     \def\@journalNameShort{ACM Comput. Surv.}%
1143
     \def\@permissionCodeOne{0360-0300}%
1144
1145 \or % DGOV
     \def\@journalName{Digital Government: Research and Practice}%
     \def\@journalNameShort{Digit. Gov. Res. Pract.}%
     \def\@permissionCodeOne{2639-0175}%
1148
1149 \or % DLT
     \def\@journalName{Distributed Ledger Technologies: Research and Practice}%
1150
     \def\@journalNameShort{Distrib. Ledger Technol.}%
1151
     \def\@permissionCodeOne{2769-6472}%
1152
1153 \or % DTRAP
     \def\@journalName{Digital Threats: Research and Practice}%
1154
     \def\@journalNameShort{Digit. Threat. Res. Pract.}%
1155
1156
     \def\@permissionCodeOne{2576-5337}%
1157 \or % FAC
     \def\@journalName{Formal Aspects of Computing}%
1158
     \def\@journalNameShort{Form. Asp. Comput.}%
1159
     \def\@permissionCodeOne{0934-5043}%
1160
     \def\@permissionCodeTwo{1433-299X}%
1161
1162 \or % GAMES
     \def\@journalName{ACM Games: Research and Practice}%
1163
     \def\@journalNameShort{ACM Games}%
1164
     \def\@permissionCodeOne{2832-5516}%
1165
1166 \or % HEALTH
     \def\@journalName{ACM Transactions on Computing for Healthcare}%
     \def\@journalNameShort{ACM Trans. Comput. Healthcare}%
1169
     \def\@permissionCodeOne{2637-8051}%
1170 \or % IMWUT
     \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
1171
```

Wearable and Ubiquitous Technologies}%

```
\def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
1173
     \def\@permissionCodeOne{2474-9567}%
1174
     \@ACM@screentrue
1175
    \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1176
1177 \or % JACM
     \def\@journalName{Journal of the ACM}%
     \def\@journalNameShort{J. ACM}%
     \def\@permissionCodeOne{0004-5411}%
1181 \or % JATS
1182
     \def\@journalName{Journal on Autonomous Transportation Systems}%
     \def\@journalNameShort{ACM J. Auton. Transport. Syst.}%
1183
     \def\@permissionCodeOne{2833-0528}%
1184
1185 \or % JDIC
     \def\@journalName{ACM Journal of Data and Information Quality}%
1186
     \def\@journalNameShort{ACM J. Data Inform. Quality}%
1187
     \def\@permissionCodeOne{1936-1955}%
1188
1189 \or % JDS
     \def\@journalName{ACM/IMS Journal of Data Science}%
     \def\@journalNameShort{ACM/IMS J. Data Sci.}%
1191
     \def\@permissionCodeOne{2831-3194}%
1192
     \def\@permissionCodeTwo{2831-3194}%
1193
1194 \or % JEA
     \def\@journalName{ACM Journal of Experimental Algorithmics}%
1195
     \def\@journalNameShort{ACM J. Exp. Algor.}%
1196
     \def\@permissionCodeOne{1084-6654}%
1197
1198 \or % JERIC
     \def\@journalName{ACM Journal of Educational Resources in Computing}%
     \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
     \def\@permissionCodeOne{1073-0516}%
1202 \or % JETC
    \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
1203
     \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
1204
     \def\@permissionCodeOne{1550-4832}%
1205
1206 \or % JOCCH
     \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
1207
     \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
1208
     \def\@permissionCodeOne{1556-4673}%
1209
1210
     \def\@permissionCodeTwo{1556-4711}%
1211 \or % JRC
     \def\@journalName{ACM Journal on Responsible Computing}%
1212
     \def\@journalNameShort{ACM J. Responsib. Comput.}%
     \def\@permissionCodeOne{2832-0565}%
1214
1215 \or % PACMCGIT
    \def\@journalName{Proceedings of the ACM on Computer Graphics and Interactive Techniques}%
1216
     \def\@journalNameShort{Proc. ACM Comput. Graph. Interact. Tech.}%
1217
     \def\@permissionCodeOne{2577-6193}%
1218
1219
     \@ACM@screentrue
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1221 \or % PACMHCI
     \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
1223
     \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
     \def\@permissionCodeOne{2573-0142}%
1224
```

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

\@ACM@screentrue

```
1227 \or % PACMMOD
     \def\@journalName{Proceedings of the ACM on Management of Data}%
1228
     \def\@journalNameShort{Proc. ACM Manag. Data}%
1229
     \def\@permissionCodeOne{2836-6573}%
1230
1231 \or % PACMNET
     \def\@journalName{Proceedings of the ACM on Networkng}%
     \def\@journalNameShort{Proc. ACM Netw.}%
     \def\@permissionCodeOne{2834-5509}%
1235 \or % PACMPL
     \def\@journalName{Proceedings of the ACM on Programming Languages}%
1236
     \def\@journalNameShort{Proc. ACM Program. Lang.}%
1237
     \def\@permissionCodeOne{2475-1421}%
1238
     \@ACM@screentrue
1239
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1240
1241 \or % PACMSE
     \def\@journalName{Proceedings of the ACM on Software Engineering}%
1242
     \def\@journalNameShort{Proc. ACM Softw. Eng.}%
     \def\@permissionCodeOne{2994-970X}%
     \@ACM@screentrue
1245
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1246
1247 \or % POMACS
    \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
1248
     \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
1249
     \def\@permissionCodeOne{2476-1249}%
1250
1251
     \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
1252
     \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
     \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
     \def\@permissionCodeOne{1556-4665}%
1256
1257 \or % TACCESS
     \def\@journalName{ACM Transactions on Accessible Computing}%
1258
     \def\@journalNameShort{ACM Trans. Access. Comput.}%
1259
     \def\@permissionCodeOne{1936-7228}%
1260
1261 \or % TACO
     \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
1262
     \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
1263
     \def\@permissionCodeOne{1544-3566}%
     \def\@permissionCodeTwo{1544-3973}%
1266 \or % TALG
     \def\@journalName{ACM Transactions on Algorithms}%
1267
1268
     \def\@journalNameShort{ACM Trans. Algor.}%
     \def\@permissionCodeOne{1549-6325}%
1269
1270 \or % TALLIP
    \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
1271
     \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
1272
     \def\@permissionCodeOne{2375-4699}%
1273
     \def\@journalName{ACM Transactions on Applied Perception}%
     \def\@journalNameShort{ACM Trans. Appl. Percept.}%
1277
     \def\@permissionCodeOne{1544-3558}%
1278 \or % TCPS
     \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
1279
```

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

```
\def\@permissionCodeOne{2378-962X}%
1281
1282 \or % TDS
     \def\@journalName{ACM/IMS Transactions on Data Science}%
1283
     \def\@journalNameShort{ACM/IMS Trans. Data Sci.}%
1284
     \def\@permissionCodeOne{2577-3224}%
1285
1286 \or % TEAC
     \def\@journalName{ACM Transactions on Economics and Computation}%
     \def\@journalNameShort{ACM Trans. Econ. Comput.}%
     \def\@permissionCodeOne{2167-8375}%
1289
1290 \or % TECS
1291
     \def\@journalName{ACM Transactions on Embedded Computing Systems}%
     \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
1292
     \def\@permissionCodeOne{1539-9087}%
1293
1294 \or % TELO
     \def\@journalName{ACM Transactions on Evolutionary Learning}%
1295
     \def\@journalNameShort{ACM Trans. Evol. Learn.}%
1296
     \def\@permissionCodeOne{2688-3007}%
1298 \or % THRI
1299
     \def\@journalName{ACM Transactions on Human-Robot Interaction}%
     \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
1300
     \def\@permissionCodeOne{2573-9522}%
1301
1302 \or % TIIS
     \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
1303
     \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
1304
     \def\@permissionCodeOne{2160-6455}%
1305
1306 \or % TIOT
     \def\@journalName{ACM Transactions on Internet of Things}%
     \def\@journalNameShort{ACM Trans. Internet Things}%
     \def\@permissionCodeOne{2577-6207}%
1310 \or % TISSEC
     \def\@journalName{ACM Transactions on Information and System Security}%
1311
     \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
1312
     \def\@permissionCodeOne{1094-9224}%
1313
1314 \or % TIST
     \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
1315
     \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
1316
     \def\@permissionCodeOne{2157-6904}%
1317
1318 \or % TKDD
     \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
     \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
1320
     \def\@permissionCodeOne{1556-4681}%
1321
1322 \or % TMIS
     \def\@journalName{ACM Transactions on Management Information Systems}%
1323
     \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
1324
     \def\@permissionCodeOne{2158-656X}%
1325
1326 \or % TOCE
     \def\@journalName{ACM Transactions on Computing Education}%
1327
     \def\@journalNameShort{ACM Trans. Comput. Educ.}%
     \def\@permissionCodeOne{1946-6226}%
1330 \or % TOCHI
1331
     \def\@journalName{ACM Transactions on Computer-Human Interaction}%
     \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
1332
     \def\@permissionCodeOne{1073-0516}%
1333
```

1334 \or % TOCL

```
\def\@journalName{ACM Transactions on Computational Logic}%
1335
     \def\@journalNameShort{ACM Trans. Comput. Logic}%
1336
     \def\@permissionCodeOne{1529-3785}%
1337
1338 \or % TOCS
     \def\@journalName{ACM Transactions on Computer Systems}%
1339
     \def\@journalNameShort{ACM Trans. Comput. Syst.}%
     \def\@permissionCodeOne{0734-2071}%
1342 \or % TOCT
     \def\@journalName{ACM Transactions on Computation Theory}%
1343
     \def\@journalNameShort{ACM Trans. Comput. Theory}%
1344
     \def\@permissionCodeOne{1942-3454}%
1345
1346 \or % TODAES
    \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
1347
     \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
1348
     \def\@permissionCodeOne{1084-4309}%
1349
1350 \or % TODS
     \def\@journalName{ACM Transactions on Database Systems}%
     \def\@journalNameShort{ACM Trans. Datab. Syst.}%
     \def\@permissionCodeOne{0362-5915}%
1353
1354 \or % TOG
     \def\@journalName{ACM Transactions on Graphics}%
1355
     \def\@iournalNameShort{ACM Trans. Graph.}%
1356
     \def\@permissionCodeOne{0730-0301}
1357
1358 \or % TOIS
     \def\@journalName{ACM Transactions on Information Systems}%
1359
     \def\@journalNameShort{ACM Trans. Inf. Syst.}%
1360
     \def\@permissionCodeOne{1046-8188}%
1362 \or % TOIT
     \def\@journalName{ACM Transactions on Internet Technology}%
     \def\@journalNameShort{ACM Trans. Internet Technol.}%
1364
     \def\@permissionCodeOne{1533-5399}%
1365
1366 \or % TOMACS
     \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
1367
     \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
1368
     \def\@permissionCodeOne{1049-3301}%
1369
     \def\@permissionCodeTwo{1558-1195}%
1370
1371 \or % TOMM
    \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
     \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
     \def\@permissionCodeOne{1551-6857}%
1374
     \def\@permissionCodeTwo{1551-6865}%
1375
1376 \or % TOMPECS
    \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
1377
     \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
1378
     \def\@permissionCodeOne{2376-3639}%
1379
1380 \or % TOMS
     \def\@journalName{ACM Transactions on Mathematical Software}%
1381
     \def\@journalNameShort{ACM Trans. Math. Softw.}%
     \def\@permissionCodeOne{0098-3500}%
1383
1384\or % TOPC
1385
     \def\@journalName{ACM Transactions on Parallel Computing}%
     \def\@journalNameShort{ACM Trans. Parallel Comput.}%
1386
```

\def\@permissionCodeOne{2329-4949}%

\def\@permissionCodeTwo{2329-4957}%

1387

```
1389 \or % TOPS
     \def\@journalName{ACM Transactions on Privacy and Security}%
     \def\@journalNameShort{ACM Trans. Priv. Sec.}%
1391
     \def\@permissionCodeOne{2471-2566}%
1392
1393 \or % TOPLAS
     \def\@journalName{ACM Transactions on Programming Languages and Systems}%
     \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
     \def\@permissionCodeOne{0164-0925}%
1397 \or % TOPML
1398
     \def\@journalName{ACM Transactions on Probabilistic Machine Learning}%
1399
     \def\@journalNameShort{ACM Trans. Probab. Mach. Learn.}%
     \def\@permissionCodeOne{2836-8924}%
1400
1401 \or % TORS
     \def\@journalName{ACM Transactions on Recommender Systems}%
1402
     \def\@journalNameShort{ACM Trans. Recomm. Syst.}%
1403
     \def\@permissionCodeOne{2770-6699}%
1404
     \def\@journalName{ACM Transactions on Storage}%
     \def\@journalNameShort{ACM Trans. Storage}%
1407
     \def\@permissionCodeOne{1553-3077}%
1408
1409 \or % TOSEM
    \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
1410
     \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
1411
     \def\@permissionCodeOne{1049-331X}%
1412
1413 \or % TOSN
     \def\@journalName{ACM Transactions on Sensor Networks}%
1414
     \def\@journalNameShort{ACM Trans. Sensor Netw.}%
     \def\@permissionCodeOne{1550-4859}%
     \def\@journalName{ACM Transactions on Quantum Computing}%
     1419
     \def\@permissionCodeOne{2643-6817}%
1420
1421 \or % TRFTS
    \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
     \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
1423
     \def\@permissionCodeOne{1936-7406}%
1424
1425 \or % TSAS
     \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
     \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
     \def\@permissionCodeOne{2374-0353}%
1428
1429 \or % TSC
     \def\@journalName{ACM Transactions on Social Computing}%
1430
     \def\@journalNameShort{ACM Trans. Soc. Comput.}%
1431
     \def\@permissionCodeOne{2469-7818}%
1432
1433 \or % TSLP
     \def\@journalName{ACM Transactions on Speech and Language Processing}%
1434
     \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
1435
     \def\@permissionCodeOne{1550-4875}%
1437 \or % TWEB
     \def\@journalName{ACM Transactions on the Web}%
1439
     \def\@journalNameShort{ACM Trans. Web}%
     \def\@permissionCodeOne{1559-1131}%
1441 \else % FACMP, a dummy journal
```

\def\@journalName{ACM Just Accepted}%

```
\def\@journalNameShort{ACM Accepted}%
                1443
                     \def\@permissionCodeOne{XXXX-XXXX}%
                1444
                1445 \fi
                1446 \ClassInfo{\@classname}{Using journal code \@journalCode}%
                1447 }{%
                     \ClassError{\@classname}{Incorrect journal #1}%
    \acmJournal And the syntactic sugar around it
                1450 \def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}%
                     \global\@ACM@journal@bibstriptrue
                     \global\@ACM@journal@bibstrip@or@togtrue}
                   The defaults:
                1453 \def\@journalCode@nr{0}
                1454 \def\@journalName{}%
                1455 \def\@journalNameShort{\@journalName}%
                1456 \def\@permissionCodeOne{XXXX-XXXX}%
                1457 \def\@permissionCodeTwo{}%
 \acmConference This is the conference command
                1458 \newcommand\acmConference[4][]{%
                     \gdef\acmConference@shortname{#1}%
                1459
                     \gdef\acmConference@name{#2}%
                1460
                     \gdef\acmConference@date{#3}%
                1461
                     \gdef\acmConference@venue{#4}%
                1462
                     \ifx\acmConference@shortname\@empty
                1463
                       \gdef\acmConference@shortname{#2}%
                1464
                     \fi
                1465
                     \global\@ACM@journal@bibstripfalse
                1466
                1467
                     \ifx\@acmBooktitle\@empty\relax
                       \acmBooktitle{Proceedings of \acmConference@name
                1468
                          \ifx\acmConference@name\acmConference@shortname\else
                1469
                          \ (\acmConference@shortname)\fi}%
                1470
                     \fi
                1471
                1472 }
                1473 \if@ACM@journal\else
                1474 \acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
                1475 DC, USA}%
                1476 \fi
  \acmBooktitle The book title of the conference:
 1478 \acmBooktitle{}
\@editorsAbbrev How to abbreviate editors
                1479 \def\@editorsAbbrev{(Ed.)}
   \@acmEditors The list of editors
                1480 \def\@acmEditors{}
        \editor Add a new editor to the list
                1481 \def\editor#1{\ifx\@acmEditors\@empty
```

```
\gdef\@acmEditors{#1}%
                       1482
                             \else
                       1483
                               \gdef\@editorsAbbrev{(Eds.)}%
                       1484
                               \g@addto@macro\@acmEditors{\and#1}%
                       1485
                       1486 \fi}
            \subtitle The subtitle macro
                       1487 \def\subtitle#1{\def\@subtitle{#1}}
                       1488 \subtitle{}
    \num@authorgroups The total number of "groups". Each group is several authors with the same affiliations(s)
                       1489 \newcount\num@authorgroups
                       1490 \num@authorgroups=0\relax
         \num@authors The total number of authors
                       1491 \newcount\num@authors
                       1492 \num@authors=0\relax
\if@insideauthorgroup Whether we are continuing an author group
                       1493 \newif\if@insideauthorgroup
                       1494 \@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.

```
1495 \renewcommand\author[2][]{%
    \IfSubStr{\detokenize{#2}}{,}{\ClassWarning{\eclassname}} Do not put several
          authors in the same \string\author\space macro!}}{}%
     \global\advance\num@authors by 1\relax
1498
     \if@insideauthorgroup\else
1499
       \global\advance\num@authorgroups by 1\relax
1500
       \global\@insideauthorgrouptrue
1501
     \fi
1502
     \ifx\addresses\@empty
1503
       \if@ACM@anonymous
1504
          \gdef\addresses{\@author{Anonymous Author(s)%
1505
            \ifx\@acmSubmissionID\@empty\else\\Submission Id:
1506
1507
              \@acmSubmissionID\fi}}%
          \gdef\authors{Anonymous Author(s)}%
1508
1509
       \else
          \expandafter\gdef\expandafter\addresses\expandafter{%
1510
            \expandafter\@author\expandafter{%
1511
              \csname typeset@author\the\num@authors\endcsname{#2}}}%
1512
         \gdef\authors{#2}%
1513
       \fi
1514
1515
     \else
       \if@ACM@anonymous\else
1516
       \expandafter\g@addto@macro\expandafter\addresses\expandafter{%
1517
          \expandafter\and\expandafter\@author\expandafter{%
1518
1519
            \csname typeset@author\the\num@authors\endcsname{#2}}}%
```

```
\fi
                                  1521
                                       \fi
                                  1522
                                        \if@ACM@anonymous
                                  1523
                                          \ifx\shortauthors\@empty
                                  1524
                                            \gdef\shortauthors{Anon.
                                  1525
                                              \ifx\@acmSubmissionID\@empty\else Submission Id:
                                  1526
                                              \@acmSubmissionID\fi}%
                                  1527
                                          \fi
                                  1528
                                        \else
                                  1529
                                          \def\ensuremath{\def}\
                                  1530
                                          \ifx\@tempa\@empty
                                  1531
                                            \ifx\shortauthors\@empty
                                  1532
                                              \gdef\shortauthors{#2}%
                                  1533
                                            \else
                                  1534
                                              \g@addto@macro\shortauthors{\and#2}%
                                  1535
                                            \fi
                                  1536
                                          \else
                                  1537
                                            \ifx\shortauthors\@empty
                                  1538
                                  1539
                                              \gdef\shortauthors{#1}%
                                  1540
                                            \else
                                              \g@addto@macro\shortauthors{\and#1}%
                                  1541
                                            \fi
                                  1542
                                          \fi
                                  1543
                                  1544
                                        \fi}
                    \affiliation The macro \affiliation mimics \address from amsart. Note that it has an optional
                                  argument, which we use differently from amsart.
                                  1545 \newcommand{\affiliation}[2][]{%
                                        \global\@insideauthorgroupfalse
                                  1546
                                        \if@ACM@anonymous\else
                                  1547
                                          \g@add to @macro \addresses {\affiliation {\#1}{\#2}} \%
                                  1548
                                  1549
ACM@affiliation@obeypunctuation Whether to use the author's punctuation (false by default, which adds American-style
                                  address punctuation)
                                  1550 \define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
                                  1551 [true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}
         \additionalaffiliation Additional affiliations go to footnotes
                                  1552 \def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}
        \@additionalaffiliation Process \additionalaffiliation inside \authornote
                                  1553 \def\@additionalaffiliation#1{\bgroup
                                       \def\position##1{\ignorespaces}%
                                  1554
                                       \def\institution##1{##1\ignorespaces}%
                                  1555
                                       \def\department{\@ifnextchar[{\@department}{\@department[]}}%
                                       \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
                                  1557
                                       \let\streetaddress\position
                                  1558
                                       \let\city\position
                                  1559
                                      \let\state\position
                                  1560
                                       \let\postcode\position
                                  1561
                                       \let\country\position
                                  1562
                                       Also with #1\unskip.\egroup}
```

\g@addto@macro\authors{\and#2}%

```
\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.
                       1564 \renewcommand{\email}[2][]{%
                            1565
                                addresses in the same \string\email\space macro!}}{}%
                       1566
                            \if@ACM@anonymous\else
                       1567
                              \g@addto@macro\addresses{\email{#1}{\#2}}\%
                       1568
                            \fi}
                       1569
                \orcid We redefine the command to typeset the current author
                       1570 \def\orcid#1{\unskip\ignorespaces%
                            \IfBeginWith{#1}{http}{%
                       1571
                              \expandafter\gdef\csname
                       1572
                                  typeset@author\the\num@authors\endcsname##1{%
                       1573
                                    \href{#1}{##1}}}{%
                       1574
                       1575
                              \expandafter\gdef\csname
                       1576
                                  typeset@author\the\num@authors\endcsname##1{%
                       1577
                                    \href{https://orcid.org/#1}{##1}}}
     \authorsaddresses Setting up authors' addresses
                       1579 \authorsaddresses{\@mkauthorsaddresses}
\@mktranslatedkeywords We have two argument: the language to typeset keywords and the keywords.
                       1580 \newcommand\@mktranslatedkeywords[2]{\bgroup
                            \selectlanguage{#1}%
                       1581
                            {\@specialsection{\keywordsname}%
                       1582
                              \noindent#2\par}\egroup}
                       1583
         \@titlenotes The title notes
                       1584 \def\@titlenotes{}
            \titlenote Adding a note to the title
                       1585 \def\titlenote#1{%
                            \g@addto@macro\@title{\footnotemark}%
                            \if@ACM@anonymous
                       1587
                              \verb|\g@addto@macro|@titlenotes{%|}
                       1588
                                \stepcounter{footnote}\footnotetext{Title note}}%
                       1589
                            \else
                       1590
                       1591
                              \label{lem:lemotes} $$  \g@addto@macro\\@titlenotes{\stepcounter{footnote}\\footnotetext{#1}}%
                       1592
                            \fi}
      \@subtitlenotes The subtitle notes
                       1593 \def\@subtitlenotes{}
        \subtitlenote Adding a note to the subtitle
                       1594 \def\subtitlenote#1{%
                            \g@addto@macro\@subtitle{\footnotemark}%
                       1595
                            \if@ACM@anonymous
                       1596
                              \g@addto@macro\@subtitlenotes{%
                       1597
                                \stepcounter{footnote}\footnotetext{Subtitle note}}%
                       1598
                            \else
                       1599
                              \g@addto@macro\@subtitlenotes{%
                       1600
```

```
\stepcounter{footnote}\footnotetext{#1}}%
                 1601
                      \fi}
                1602
  \@authornotes The author notes
                1603 \def\@authornotes{}
    \authornote Adding a note to the author
                1604 \def\authornote#1{%
                 1605
                      \if@ACM@anonymous\else
                        \g@addto@macro\addresses{\@authornotemark}%
                        \verb|\g@addto@macro||@authornotes||%|
                           \stepcounter{footnote}\footnotetext{#1}}%
                 1608
                 1609
                      \fi}
\authornotemark Adding a footnote mark to the authors
                1610 \newcommand\authornotemark[1][\relax]{%
                      \ifx#1\relax\relax\relax
                      \g@addto@macro\addresses{\@authornotemark}%
                      \else
                      \g@addto@macro\addresses{\@@authornotemark{\#1}}\%
                1614
                1615
                      \fi}
     \acmVolume The current volume
                 1616 \def\acmVolume#1{\def\@acmVolume{#1}}
                 1617 \acmVolume{1}
     \acmNumber The current number
                1618 \def\acmNumber#1{\def\@acmNumber{#1}}
                 1619 \acmNumber{1}
    \acmArticle The current article
                1620 \def\acmArticle#1{\def\@acmArticle{#1}}
                1621 \acmArticle{}
 \acmArticleSeq The sequence number
                1622 \def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
                1623 \acmArticleSeq{\@acmArticle}
       \acmYear The current year
                1624 \def\acmYear#1{\def\@acmYear{#1}}
                1625 \acmYear{\the\year}
      \acmMonth The current month
                1626 \def\acmMonth#1{\def\@acmMonth{#1}}
                1627 \acmMonth{\the\month}
   \@acmPubDate The publication date
                 1628 \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}
                 1631
```

```
\acmPrice The price—obsolete
                 is obsolete. ACM no longer prints the price in bibstrip.}}
\acmSubmissionID The submission ID
                 1634 \def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
                 1635 \acmSubmissionID{}
        \acmISBN The book ISBN
                 1636 \def\acmISBN#1{\def\@acmISBN{#1}}
                 1637 \acmISBN{978-x-xxxx-xxxx-x/YY/MM}
         \acmDOI The paper DOI
                 1638 \def\acmDOI#1{\def\@acmDOI{#1}}
                 1639 \acmDOI{10.1145/nnnnnnn.nnnnnnn}
   \if@ACM@badge
\@ACM@badge@width The width of the badge
                 1640 \newlength\@ACM@badge@width
                 1641 \setlength\@ACM@badge@width{3pc}
\@ACM@title@width The width of the title
                 1642 \newlength\@ACM@title@width
\@ACM@badge@skip The spacing between badges
                 1643 \newlength\@ACM@badge@skip
                 1644 \setlength\@ACM@badge@skip{1pt}
     \@acmBadgeR
                 1645 \def\@acmBadgeR{}
     \@acmBadgeL
                 1646 \def\@acmBadgeL{}
      \acmBadgeR Setting the right badge
                 1647 \newcommand\acmBadgeR[2][]{%
                       \ifx\@acmBadgeR\@empty
                 1648
                         \gdef\@acmBadgeR{%
                 1649
                           \smash{%
                 1650
                 1651
                             \raisebox{0.5}height}{%}
                               \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}%
                 1652
                 1653
                       \else
                         \g@addto@macro{\@acmBadgeR}{%
                 1654
                           \hspace{\@ACM@badge@skip}%
                 1655
                           \smash{%
                 1656
                             \raisebox{0.5\height}{%
                 1657
                               \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}%
                 1658
                      \fi}
                 1659
```

```
\acmBadgeL Setting the left badge
                                  1660 \newcommand\acmBadgeL[2][]{%
                                              \ifx\@acmBadgeL\@empty
                                  1661
                                                  \gdef\@acmBadgeL{%
                                  1662
                                                       \smash{%
                                  1663
                                  1664
                                                           \raisebox{0.5\height}{%
                                  1665
                                                               \href{#1}{\includegraphics[width=\@ACM@badge@width]{#2}}}}%
                                  1666
                                              \else
                                                  \g@addto@macro{\@acmBadgeL}{%
                                  1667
                                                       \hspace{\@ACM@badge@skip}%
                                  1668
                                                       \smash{%
                                  1669
                                                           \rowniana \noindent{0.5\height}{\%}
                                  1670
                                                                1671
                                             \fi}
                                  1672
           \acmBadge Just a syntax sugar for \acmBadgeR
                                  1673 \let\acmBadge=\acmBadgeR
         \startPage The start page of the paper
                                  1674 \def\startPage#1{\def\@startPage{#1}}
                                  1675 \startPage{}
                  \terms Terms are obsolete. We use CCS now.
                                  1676 \ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath
                                                  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.
                                  1678 \def\keywords#1{\def\@keywords{#1}}
                                  1679 \let\@keywords\@empty
                                  1680 \AtEndDocument{\if@ACM@nonacm\else\ifx\@keywords\@empty
                                            \ifnum\getrefnumber{TotPages}>2\relax
                                             \ClassWarningNoLine{\@classname}{ACM keywords are mandatory
                                  1682
                                                  for papers over two pages}%
                                  1683
                                            \fi\fi\fi}
                                  1684
             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
                                  1685 \renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
\@saveabstract And saving the abstract
                                  {\tt 1686 \ long\ def\ @saveabstract\#1{\tt if@ACM@maketitle@typeset}}
                                            \ClassError{\@classname}{Abstract must be defined before maketitle
                                                  command. Please move it!}\fi
                                  1688
                                            \long\gdef\@abstract{#1}}
                                  1690 \@saveabstract{}
             \@lempty The long version of \@empty (to compare with \@abstract)
                                  1691 \long\def\@lempty{}
```

```
\if@ACM@printccs Whether to print CCS
                    1692 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
                         \if@ACM@printccs
                    1693
                           \ClassInfo{\@classname}{Printing CCS}%
                    1694
                    1695
                    1696
                           \ClassInfo{\@classname}{Suppressing CCS}%
                        fi}{\classError{\ensuremath{\classError}{\classname}}}
\if@ACM@printacmref Whether to print the ACM bibstrip
                    1698 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
                         \if@ACM@printacmref
                           \ClassInfo{\@classname}{Printing bibformat}%
                    1700
                    1701
                         \else
                           \ClassInfo{\@classname}{Suppressing bibformat}%
                    1702
                        fi}{\classError{\classname}{\classname}}
                    1703
                    1704 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@printacmref\else
                         \ifnum\getrefnumber{TotPages}>1\relax
                         \ClassWarningNoLine{\@classname}{%
                           ACM reference format is mandatory \MessageBreak
                           for papers over one page. \MessageBreak
                    1708
                           Please add printacmref=true to the \MessageBreak
                    1709
                           \string\settopmatter\space command.}%
                    1710
                         \fi\fi\fi}
                    1711
\if@ACM@printfolios Whether to print folios
                    1712 \define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
                         \if@ACM@printfolios
                    1713
                           \ClassInfo{\@classname}{Printing folios}%
                    1714
                    1715
                           \ClassInfo{\@classname}{Suppressing folios}%
                    1716
                    1717 \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.
                    1718 \define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrow}[0]{%
                         \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
                    1719
                             #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
                    1720
                             numerical. Ignoring the input #1\del{acm@authorsperrow{0}}
                    1721
      \settopmatter The usual syntactic sugar
                    1722 \def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
                       Now the settings
                    1723 \settopmatter{printccs=true, printacmref=true}
                    1724 \if@ACM@manuscript
                    1725 \settopmatter{printfolios=true}
                    1726 \else
                         \if@ACM@journal
                    1727
                           \settopmatter{printfolios=true}
                    1728
                    1729
                         \else
                           \settopmatter{printfolios=false}
                    1730
                        \fi
                    1731
                    1732 \fi
                    1733 \settopmatter{authorsperrow=0}
```

```
\@received The container for the paper history
                   1734 \def\@received{}
        \received The \received command
                   1735 \newcommand\received[2][]{\def\@tempa{#1}%
                   1736
                        \ifx\@tempa\@empty
                   1737
                           \ifx\@received\@empty
                   1738
                             \gdef\@received{Received #2}%
                   1739
                           \else
                             \g@addto@macro{\@received}{; revised #2}%
                           \fi
                   1741
                   1742
                         \else
                           \ifx\@received\@empty
                   1743
                             \gdef\ensuremath{\mbox{\tt @received{\#1 \#2}}\%}
                   1744
                           \else
                   1745
                             \g@addto@macro{\@received}{; #1 #2}%
                   1746
                           \fi
                   1747
                        \fi}
                   1748
                   1749 \AtEndDocument{%
                        \ifx\@received\@empty\else
                   1751
                           \par\bigskip\noindent\small\normalfont\@received\par
                   1752
                        \fi}
 \acmArticleType Article type. We set up the color.
                   1753 \define@choicekey+{ACM}{articletype}[\ACM@ArticleType\ACM@ArticleType@nr]{%
                        Research,Review,Discussion,Invited,Position}[Review]{%
                        \ifcase\ACM@ArticleType@nr
                   1755
                        \relax % Research
                   1756
                            \colorlet{@ACM@Article@color}{ACMBlue}%
                   1757
                         \or % Review
                   1758
                            \colorlet{@ACM@Article@color}{ACMOrange}%
                   1759
                   1760
                         \or % Discussion
                            \colorlet{@ACM@Article@color}{ACMGreen}%
                   1761
                   1762
                         \or % Invited
                            \colorlet{@ACM@Article@color}{ACMPurple}%
                   1763
                   1764
                         \or % Position
                            \colorlet{@ACM@Article@color}{ACMRed}%
                   1765
                        \fi
                   1766
                   1767 }{%
                   1768 \ClassError{\@classname}{Article Type must be Research, Review,\MessageBreak
                          Discussion, Invited, or Position}}
                   1770 \def\acmArticleType#1{\setkeys{ACM}{articletype=#1}}
                   1771 \if@ACM@acmcp
                   1772 \acmArticleType{Research}%
                   1773 \fi
                   1774
\@ACM@color@frame The colored frame for the acmcp
                   1775 \newenvironment{@ACM@color@frame}{%
                        \def\FrameCommand{\hspace*{-6.5pc}%
                   1776
                           \colorbox{@ACM@Article@color!10!white}}%
                   1777
                        \MakeFramed {\advance\hsize
                   1778
                           -6.5pc\relax\FrameRestore}}{\zsaveposy{@ACM@acmcpframe@y}%
                   1779
                   1780
                        \endMakeFramed}
```

```
\acmCodeDataLink The code link
                 1781 \def\acmCodeLink#1{%
                 1782
                      \ifx\@acmCodeDataLink\@empty
                 1783
                          \gdef\@acmCodeDataLink{\url{#1}}%
                      \else
                 1785
                          1786
                      \fi}
                 1787 \def\@acmCodeDataLink{}
\acmContributions The authors' contrubution statement
                 1788 \def\acmContributions#1{\gdef\@acmContributions{#1}}
                 1789 \acmContributions{}
    \acmDataLink The code link
                 1790 \let\acmDataLink\acmCodeLink
                        Concepts system
                 We exclude CCSXML stuff generated by the ACM system:
                 1791 \RequirePackage{comment}
                 1792 \excludecomment{CCSXML}
      \@concepts This is the storage macro and counter for concepts
                 1793 \let\@concepts\@empty
                 1794 \newcounter{@concepts}
        \ccsdesc The first argument is the significance, the second is the concept(s)
                 1795 \newcommand\ccsdesc[2][100]{%
                 1796 \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!
                 1797 \def\textrightarrow{$\rightarrow$}
                 1798 \def\ccsdesc@parse#1~#2~#3~{%
                       \stepcounter{@concepts}%
                 1799
                       \expandafter\ifx\csname CCS@General@#2\endcsname\relax
                 1800
                         \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
                 1801
                 1802
                           \textbf{#2}}%
                         \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
                 1803
                         \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
                 1804
                       \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
                 1805
                         \csname CCS@Punctuation@#2\endcsname
                 1806
                         \csname CCS@Specific@#2\endcsname}%
                 1807
                 1808
                       \ifx#3\relax\relax\else
                 1809
                         \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
                 1810
                           \textrightarrow\ }%
                 1811
                       \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
                 1812
                 1813
                          \addtocounter{@concepts}{-1}%
                          1814
                          1815
                          #3\fi\fi\ifnum\value{@concepts}=0.\else; \fi}%
                 1816
                      \fi
                 1817
                 1818 \ccsdesc@parse@finish}
```

```
1819 \AtEndDocument{\if@ACM@nonacm\else\ifx\@concepts\@empty\relax
                           \ifnum\getrefnumber{TotPages}>2\relax
                      1820
                           \ClassWarningNoLine{\@classname}{CCS concepts are mandatory
                      1821
                      1822
                              for papers over two pages}%
                           \fi\fi\fi}
                      1823
\ccdesc@parse@finish Gobble everything to \ccsdesc@parse@end
                      1824 \def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
                             Copyright system
                      This is from acmcopyright.sty
  \if@printcopyright Whether to print a copyright symbol
                      1825 \newif\if@printcopvright
                      1826 \@printcopyrighttrue
\if@printpermission Whether to print the permission block
                      1827 \newif\if@printpermission
                      1828 \@printpermissiontrue
        \if@acmowned Whether the ACM owns the rights to the paper
                      1829 \newif\if@acmowned
                      1830 \@acmownedtrue
                         Keys:
                      1831 \define@choicekey*{ACM@}{acmcopyrightmode}[%
                           \acm@copyrightinput\acm@copyrightmode]{none,%
                      1832
                             acmcopyright,acmlicensed,rightsretained,%
                      1833
                      1834
                             usgov, usgovmixed, cagov, cagovmixed, licensedusgovmixed, %
                      1835
                             licensedcagov, licensedcagovmixed, othergov, licensedothergov, %
                             iw3c2w3,iw3c2w3g,cc}{%
                      1836
                           \@printpermissiontrue
                      1837
                           \@printcopyrighttrue
                      1838
                           \@acmownedtrue
                      1839
                           \ifnum\acm@copyrightmode=0\relax % none
                      1840
                            \@printpermissionfalse
                      1841
                             \@printcopyrightfalse
                      1842
                      1843
                             \@acmownedfalse
                      1844
                            \ifnum\acm@copyrightmode=2\relax % acmlicensed
                      1845
                            \@acmownedfalse
                      1846
                      1847
                           \ifnum\acm@copyrightmode=3\relax % rightsretained
                      1848
                            \@acmownedfalse
                      1849
                      1850
                           \ifnum\acm@copyrightmode=4\relax % usgov
                      1851
                            \@printpermissiontrue
                      1852
                            \@printcopyrightfalse
                      1853
                            \@acmownedfalse
                      1854
                      1855
                      1856
                           \ifnum\acm@copyrightmode=6\relax % cagov
                      1857
                            \@acmownedfalse
```

```
1858
                       \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
                  1859
                        \@acmownedfalse
                  1860
                  1861
                       \ifnum\acm@copyrightmode=9\relax % licensedcagov
                  1862
                        \@acmownedfalse
                  1863
                  1864
                       \ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
                        \@acmownedfalse
                  1866
                       \fi
                  1867
                       \ifnum\acm@copyrightmode=11\relax % othergov
                  1868
                        \@acmownedtrue
                  1869
                  1870
                       \ifnum\acm@copyrightmode=12\relax % licensedothergov
                  1871
                        \@acmownedfalse
                  1872
                  1873
                       \ifnum\acm@copyrightmode=13\relax % iw3c2w3
                  1874
                        \@acmownedfalse
                  1875
                  1876
                       \fi
                       \ifnum\acm@copyrightmode=14\relax % iw3c2w3g
                  1877
                        \@acmownedfalse
                  1878
                  1879
                       \ifnum\acm@copyrightmode=15\relax % cc
                  1880
                        \@acmownedfalse
                  1881
                  1882
                       \fi}
   \setcopyright This is the syntactic sugar around setting keys.
                  1883 \def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
                  1884 \setcopyright{acmlicensed}
      \setcctype The type of Creative Commons license used
                  1885 \newcommand\setcctype[2][4.0]{%
                       \def\ACM@cc@version{#1}%
                  1887 \def\ACM@cc@type{#2}}
                  1888 \setcctype{by}
\@copyrightowner Here is the owner of the copyright
                  1889 \def\@copyrightowner{%
                       \ifcase\acm@copyrightmode\relax % none
                  1890
                       \or % acmcopyright
                  1891
                       ACM\@.
                  1892
                       \or % acmlicensed
                  1893
                       Copyright held by the owner/author(s). Publication rights licensed to
                  1894
                  1895
                       \or % rightsretained
                  1896
                       Copyright held by the owner/author(s).
                  1897
                  1898
                       \or % usgov
                  1899
                       \or % usgovmixed
                      Copyright held by the owner/author(s).
                  1900
                       \or % cagov
                  1901
                  1902 Copyright Crown in Right of Canada.
                       \or %cagovmixed
                  1903
                       Copyright held by the owner/author(s).
                  1904
                       \or %licensedusgovmixed
```

```
Copyright held by the owner/author(s). Publication rights licensed to
                          1906
                               ACM\@.
                          1907
                               \or % licensedcagov
                          1908
                               Copyright held by the owner/author(s).
                          1909
                               \or %licensedcagovmixed
                          1910
                               Copyright held by the owner/author(s). Publication rights licensed to
                               ACM\@.
                               \or % othergov
                          1913
                               Copyright held by the owner/author(s).
                          1914
                               1915
                               Copyright held by the owner/author(s). Publication rights licensed to
                          1916
                               ACM\@.
                          1917
                               \or % ic2w3www
                          1918
                               IW3C2 (International World Wide Web Conference Committee), published
                          1919
                               under Creative Commons CC-BY~4.0 License.
                          1920
                                \or % ic2w3wwwgoogle
                          1921
                               IW3C2 (International World Wide Web Conference Committee), published
                               under Creative Commons CC-BY-NC-ND~4.0 License.
                          1924
                               \or % cc
                               Copyright held by the owner/author(s).
                          1925
                          1926
                               \fi}
             \@formatdoi Print a clickable DOI
                          1927 \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.
                          1928 \def\@ACM@copyright@check@cc{%
                          1929
                               \if@ACM@nonacm
                                   \ClassInfo{\@classname}{Using CC license with a non-acm
                          1930
                                     material}%
                          1931
                          1932
                               \else
                                   \if@ACM@engage
                          1933
                                      \ClassInfo{\@classname}{Using CC license with ACM Enage
                          1934
                                        material}%
                          1935
                                    \else
                          1936
                                    \ClassWarning{\@classname}{%
                          1937
                                     Sorry, Creative Commons licenses are\MessageBreak
                          1938
                                     currently not used with ACM publications\MessageBreak
                          1939
                                      typeset by the authors}{Please use nonacm
                          1940
                                         option or ACM Engage class to enable CC licenses}%
                          1941
                                    \fi
                          1942
                          1943
                               \fi}
   \@copyrightpermission The canned permission block.
                          1944 \def\@copyrightpermission{%
                               \ifcase\acm@copyrightmode\relax % none
                          1945
                               \or % acmcopyright
                          1946
                                Permission to make digital or hard copies of all or part of this
                          1947
                                work for personal or classroom use is granted without fee provided
                          1948
                                that copies are not made or distributed for profit or commercial
                          1949
                                advantage and that copies bear this notice and the full citation on
                          1950
                                the first page. Copyrights for components of this work owned by
                          1951
```

others than ACM must be honored. Abstracting with credit is

```
permitted. To copy otherwise, or republish, to post on servers or
1953
      to redistribute to lists, requires prior specific permission
1954
      and hspace * {.5pt}/or
1955
      a fee. Request permissions from permissions@acm.org.
1956
1957
     \or % acmlicensed
      Permission to make digital or hard copies of all or part of this
1958
      work for personal or classroom use is granted without fee provided
      that copies are not made or distributed for profit or commercial
1960
      advantage and that copies bear this notice and the full citation on
1961
      the first page. Copyrights for components of this work owned by
1962
      others than the author(s) must be honored. Abstracting with credit
1963
      is permitted. To copy otherwise, or republish, to post on servers
1964
      or to redistribute to lists, requires prior specific permission
1965
      and\hspace*{.5pt}/or a fee. Request permissions from
1966
      permissions@acm.org.
1967
     \or % rightsretained
1968
      Permission to make digital or hard copies of part or all of this
      work for personal or classroom use is granted without fee provided
1970
      that copies are not made or distributed for profit or commercial
1971
      advantage and that copies bear this notice and the full citation on
1972
      the first page. Copyrights for third-party components of this work
1973
      must be honored. For all other uses, contact the
1974
      owner\hspace*{.5pt}/author(s).
1975
     \or % usgov
1976
1977
      This paper is authored by an employee(s) of the United States
      Government and is in the public domain. Non-exclusive copying or
1978
      redistribution is allowed, provided that the article citation is
1979
      given and the authors and agency are clearly identified as its
      source. All others Request permissions from
1981
1982
      owner\hspace*{.5pt}/author(s).
     \or % usgovmixed
1983
      ACM acknowledges that this contribution was authored or co-authored
1984
      by an employee, contractor, or affiliate of the United States
1985
      government. As such, the United States government retains a
1986
      nonexclusive, royalty-free right to publish or reproduce this
1987
      article, or to allow others to do so, for government purposes
1988
      only. Request permissions from owner\hspace*{.5pt}/author(s).
1989
     \or % cagov
      This article was authored by employees of the Government of
1992
      Canada. As such, the Canadian government retains all interest in
1993
      the copyright to this work and grants to ACM a nonexclusive,
1994
      royalty-free right to publish or reproduce this article, or to
      allow others to do so, provided that clear attribution is given
1995
      both to the authors and the Canadian government agency employing
1996
      them. Permission to make digital or hard copies for personal or
1997
      classroom use is granted. Copies must bear this notice and the full
1998
1999
      citation on the first page. Copyrights for components of this work
```

2004 \or % cagovmixed

owner\hspace*{.5pt}/author(s).

2002

2003

 $_{2005}$ ACM acknowledges that this contribution was co-authored by an $_{2006}$ affiliate of the national government of Canada. As such, the Crown

specific permission and/or a fee. Request permissions from

owned by others than the Canadian Government must be honored. To copy otherwise, distribute, republish, or post, requires prior

```
in Right of Canada retains an equal interest in the
2007
      copyright. Reprints must include clear attribution to ACM and the
2008
      author's government agency affiliation. Permission to make digital
2009
      or hard copies for personal or classroom use is granted. Copies
2010
2011
      must bear this notice and the full citation on the first
      page. Copyrights for components of this work owned by others than
      ACM must be honored. To copy otherwise, distribute, republish, or
2013
      post, requires prior specific permission and/or a fee. Request
2014
      permissions from owner\hspace*{.5pt}/author(s).
2015
2016
     \or % licensedusgovmixed
      Publication rights licensed to ACM\@. ACM acknowledges that this
2017
      contribution was authored or co-authored by an employee, contractor
2018
      or affiliate of the United States government. As such, the
2019
      Government retains a nonexclusive, royalty-free right to publish or
2020
      reproduce this article, or to allow others to do so, for Government
2021
      purposes only. Request permissions from
2022
      owner\hspace*{.5pt}/author(s).
     \or % licensedcagov
2024
      This article was authored by employees of the Government of
2025
      Canada. As such, the Canadian government retains all interest in
2026
      the copyright to this work and grants to ACM a nonexclusive,
2027
      royalty-free right to publish or reproduce this article, or to
2028
      allow others to do so, provided that clear attribution is given
2029
      both to the authors and the Canadian government agency employing
2030
2031
      them. Permission to make digital or hard copies for personal or
2032
      classroom use is granted. Copies must bear this notice and the full
      citation on the first page. Copyrights for components of this work
      owned by others than the Canadian Government must be honored. To
      copy otherwise, distribute, republish, or post, requires prior
2035
2036
      specific permission and/or a fee. Request permissions from
      owner\hspace*{.5pt}/author(s).
2037
     \or % licensedcagovmixed
2038
      Publication rights licensed to ACM. ACM acknowledges that this
2039
      contribution was authored or co-authored by an employee, contractor
2040
      or affiliate of the national government of Canada. As such, the
2041
      Government retains a nonexclusive, royalty-free right to publish or
2042
      reproduce this article, or to allow others to do so, for Government
2043
      purposes only. Request permissions from
2045
      owner\hspace*{.5pt}/author(s).
2046
     \or % othergov
2047
      ACM acknowledges that this contribution was authored or co-authored
2048
      by an employee, contractor or affiliate of a national
      government. As such, the Government retains a nonexclusive,
2049
      royalty-free right to publish or reproduce this article, or to
2050
      allow others to do so, for Government purposes only. Request
2051
      permissions from owner\hspace*{.5pt}/author(s).
2052
2053
     \or % licensedothergov
      Publication rights licensed to ACM\@. ACM acknowledges that this
2054
      contribution was authored or co-authored by an employee, contractor
2055
2056
      or affiliate of a national government. As such, the Government
2057
      retains a nonexclusive, royalty-free right to publish or reproduce
2058
      this article, or to allow others to do so, for Government purposes
```

only. Request permissions from owner\hspace*{.5pt}/author(s).

2059

2060 \or % iw3c2w3

```
This paper is published under the Creative Commons Attribution~4.0
                               2061
                                           International (CC-BY~4.0) license. Authors reserve their rights to
                               2062
                                           disseminate the work on their personal and corporate Web sites with
                               2063
                                           the appropriate attribution.
                               2064
                                       \or % iw3c2w3g
                               2065
                                           This paper is published under the Creative Commons
                               2066
                                           Attribution-NonCommercial-NoDerivs~4.0 International
                               2067
                                           (CC-BY-NC-ND~4.0) license. Authors reserve their rights to
                                           disseminate the work on their personal and corporate Web sites with
                               2069
                                           the appropriate attribution.
                               2070
                               2071 \or % CC
                                           \@ACM@copyright@check@cc
                               2072
                                           \IfEq{\ACM@cc@type}{zero}{%
                               2073
                                            \def\ACM@CC@Url{https://creativecommons.org/publicdomain/zero/1.0/legalcode}}{%
                               2074
                                        \edef\ACM@CC@Url{https://creativecommons.org/licenses/\ACM@cc@type/\ACM@cc@version/legalcode}}%
                               2075
                                         \href{\ACM@CC@Url}{\includegraphics[height=5ex]{doclicense-CC-\ACM@cc@type-88x31}}\\
                               2076
                                           \href{\ACM@CC@Url}{%
                               2077
                                           This work is licensed under a Creative Commons
                               2078
                               2079
                                           \IfEq{\ACM@cc@type}{zero}{CC0 1.0 Universal}{%
                               2080
                                               \IfEq{\ACM@cc@type}{by}{Attribution}{}%
                                               \IfEq{\ACM@cc@type}{by-sa}{Attribution-ShareAlike}{}%
                               2081
                                               2082
                                               \IfEq{\ACM@cc@type}{by-nc}{Attribution-NonCommercial}{}%
                               2083
                                               \IfEq{\ACM@cc@type}{by-nc-sa}{Attribution-NonCommercial-ShareAlike}{}%
                               2084
                               2085
                                            \IfEq{\ACM@cc@type}{by-nc-nd}{Attribution-NonCommercial-NoDerivatives}{}%
                               2086
                                                `\IfEq{\ACM@cc@version}{4.0}{4.0 International}{3.0 Unported}%
                               2087
                                           License.}%
                               2088
                               2089 \fi}
 \copyrightyear By default, the copyright year is the same as \acmYear, but one can override this:
                               2090 \def\copyrightyear#1{\def\@copyrightyear{#1}}
                               2091 \copyrightyear{\@acmYear}
\@teaserfigures The teaser figures container
                               2092 \def\@teaserfigures{}
     teaserfigure The teaser figure
                               2093 \newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}
     \@saveteaser Saving the teaser
                               2094 \long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}
               \thanks We redefine amsart \thanks so the anonymous key works
                               2095 \renewcommand{\thanks}[1]{%
                                         \@ifnotempty{#1}{%
                               2097
                                             \if@ACM@anonymous
                                                 \g@addto@macro\thankses{\thanks{A note}}%
                               2098
                               2099
                                           \else
                                             \gen{array}{ll} \gen{array}{
                               2100
                               2101
                   \anon We provide \anon command, which obscures parts of the text if the package option
```

anonymous is set

```
2102 \newcommand{\anon}[2][ANONYMIZED]{%
2103 \if@ACM@anonymous%
2104 {\color{ACMOrange}#1}%
2105 \else%
2106 #2%
2107 \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

```
2108 \ifx\@beginmaketitlehook\@undefined
2109 \let\@beginmaketitlehook\@empty
2110 \fi
```

\AtBeginMaketitle Adding to the hook

2111 \def\AtBeginMaketitle{\g@addto@macro\@beginmaketitlehook}

3.20 ACM Engage top matter

\@acmengagemetadata The special metadata for ACM engage course materials

2112 \def\@acmengagemetadata{}

\setengagemetadata Adding topic to engage metadata

```
2113 \def\setengagemetadata#1#2{%
2114 \g@addto@macro{\@acmengagemetadata}{%
2115 \@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[$\langle box \rangle$].

2116 \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.

```
2117 \def\maketitle{\@beginmaketitlehook
     \@ACM@maketitle@typesettrue
     \if@ACM@anonymous
2119
       % Anonymize omission of \author-s
2120
2121
       \ifnum\num@authorgroups=0\author{}\fi
2122 \fi
    \begingroup
2123
    \let\@vspace\@vspace@orig
2124
     \let\@vspacer\@vspacer@orig
2125
     \let\@footnotemark\@footnotemark@nolink
```

```
\let\@footnotetext\@footnotetext@nolink
2127
     \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
2128
     \hsize=\textwidth
2129
     \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
2130
     \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
2131
     \@printtopmatter
2132
     \if@ACM@sigchiamode\@mkauthors\fi
2133
     \setcounter{footnote}{0}%
2134
     2135
2136
     \@titlenotes
2137
     \@subtitlenotes
     \@authornotes
2138
     \let\@makefnmark\relax
2139
     \let\@thefnmark\relax
2140
     \let\@makefntext\noindent
2141
     \ifx\@empty\thankses\else
2142
       \footnotetextauthorsaddresses{%
2143
         \def\par{\let\par\@par}\parindent\z@\@setthanks}%
2144
2145
     \fi
     \if@ACM@acmcp\else
2146
       \ifx\@empty\@authorsaddresses\else
2147
          \if@ACM@anonymous\else
2148
            \if@ACM@journal@bibstrip@or@tog
2149
              \footnotetextauthorsaddresses{%
2150
                 \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
2151
            \fi
2152
          \fi
2153
       \fi
2154
     \fi
2155
     \if@ACM@nonacm
2156
       \ifnum\acm@copyrightmode=15\relax % cc
2157
          \footnotetextcopyrightpermission{\@copyrightpermission}%
2158
       \fi
2159
     \else
2160
       \if@ACM@acmcp\else
2161
       \footnotetextcopyrightpermission{%
2162
       \if@ACM@authordraft
2163
2164
           \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][1]{\large\bfseries
2165
               Unpublished working draft. Not for distribution.}}%
2166
          \color[gray]{0.9}%
       \fi
2167
2168
       \parindent\z@\parskip0.1\baselineskip
2169
       \if@ACM@authorversion\else
         \if@printpermission\@copyrightpermission\par\fi
2170
       \fi
2171
       \if@ACM@manuscript\else
2172
          \if@ACM@journal@bibstrip\else % Print the conference information
2173
2174
            \if@ACM@engage
               {\itshape \@acmBooktitle, \@acmYear.}\par
2175
2176
2177
         {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
2178
            \fi
          \fi
2179
       \fi
2180
```

```
\if@printcopyright
2181
          \copyright\ \@copyrightyear\ \@copyrightowner\\
2182
       \else
2183
          \@copyrightyear.\
2184
2185
       \if@ACM@manuscript
2186
         Manuscript submitted to ACM\\
2187
2188
       \else
          \if@ACM@authorversion
2189
              This is the author's version of the work. It is posted here for
2190
              your personal use. Not for redistribution. The definitive Version
2191
              of Record was published in
2192
              \if@ACM@journal@bibstrip
2193
                \emph{\@journalName}%
2194
              \else
2195
                \emph{\@acmBooktitle}%
2196
              \fi
2197
              \ifx\@acmDOI\@empty
2199
2200
              \else
                , \@formatdoi{\@acmDOI}.
2201
              \fi\\
2202
            \else
2203
              \if@ACM@nonacm\else
2204
                \if@ACM@journal@bibstrip
2205
                  ACM^{\operatorname{QpermissionCodeOne/QacmYear/QacmMonth-ART}} \\
2206
                  \@formatdoi{\@acmDOI}%
2207
                \else % Conference
2208
                  \ \ \ ACM^ISBN^Qempty\else\ ACM^ISBN^QemISBN\fi
2209
                  \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
2210
                \fi
2211
              \fi
2212
            \fi
2213
          \fi}%
2214
       \fi
2215
2216
     \endgroup
2217
2218
     \if@ACM@engage\@typesetengagemetadata\fi
     \setcounter{footnote}{0}%
2220
     \@mkabstract
     \ifx\@translatedabstracts\@empty\else
2221
2222
     \@translatedabstracts\fi
     \if@ACM@printccs
2223
     \ifx\@concepts\@empty\else\bgroup
2224
          {\@specialsection{CCS Concepts}%
2225
             \noindent\@concepts\par}\egroup
2226
        \fi
2227
      \fi
2228
      \if@ACM@acmcp\else
2229
2230
         \ifx\@keywords\@empty\else\bgroup
2231
            {\@specialsection{\keywordsname}%
2232
               \noindent\@keywords\par}\egroup
        \fi
2233
       \ifx\@translatedkeywords\@empty\else
2234
```

```
\@translatedkeywords
                                                           \fi
                                          2236
                                                      \fi
                                          2237
                                                      \let\metadata@authors=\authors
                                          2238
                                                      \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
                                          2239
                                                      \def\@ACM@checkaffil{}%
                                          2240
                                                      \hypersetup{%
                                          2241
                                                           pdfauthor={\metadata@authors},
                                          2242
                                          2243
                                                           pdftitle={\@title},
                                                           pdfsubject={\@concepts},
                                          2244
                                                           pdfkeywords={\@keywords},
                                          2245
                                                           pdfcreator={LaTeX with acmart
                                          2246
                                                                \csname ver@acmart.cls\endcsname\space
                                          2247
                                          2248
                                                                and hyperref
                                                                \csname ver@hyperref.sty\endcsname}}%
                                          2249
                                                       \andify\authors
                                          2250
                                                       \andify\shortauthors
                                          2251
                                                       \global\let\authors=\authors
                                          2253
                                                       \global\let\shortauthors=\shortauthors
                                          2254
                                                       \if@ACM@printacmref
                                          2255
                                                              \@mkbibcitation
                                                      \fi
                                          2256
                                                       \global\@topnum\z@ % this prevents floats from falling
                                          2257
                                                                                                   % at the top of page 1
                                          2258
                                                      \global\@botnum\z@ % we do not want them to be on the bottom either
                                          2259
                                          2260
                                                      \@printendtopmatter
                                                      \@afterindentfalse
                                          2261
                                                      \@afterheading
                                          2262
                                                      \if@ACM@acmcp
                                          2263
                                          2264
                                                           \set@ACM@acmcpbox
                                                           \AtEndDocument{\end@ACM@color@frame}%
                                          2265
                                          2266
                                                           \@ACM@color@frame
                                                     \fi
                                          2267
                                          2268 }
\set@ACM@acmcpbox Setting infobox for acmcp
                                          2269 \newbox\@ACM@acmcpbox
                                          2270 \def\set@ACM@acmcpbox{%
                                                     \bgroup
                                          2271
                                                      \hsize=5pc
                                          2272
                                                       \global\setbox\@ACM@acmcpbox=\vbox{%
                                          2273
                                                           \setlength{\parindent}{\z@}%
                                          2274
                                                           {\includegraphics[width=\hsize]{acm-jdslogo}\par}%
                                          2275
                                                           \scriptsize
                                          2276
                                                           \ifnum\getrefnumber{TotPages}>1\else
                                          2277
                                                                \zrefused{@ACM@acmcpbox@y}%
                                          2279
                                                                \zrefused{@ACM@acmcpframe@y}%
                                          2280
                                                                \@tempdima=\dimexpr\zposy{@ACM@acmcpbox@y}sp -
                                          2281
                                                                \zposy{@ACM@acmcpframe@y}sp+0.3\FrameSep+
                                                                \@ACM@acmcp@delta\relax
                                          2282
                                                                \ifdim\@tempdima>0pt\relax
                                          2283
                                                                       \vspace*{\@tempdima}%
                                          2284
                                                                       \protected@write\@auxout{}%
                                          2285
                                                                       2286
```

```
\fi
                  2288
                          \ifx\@acmCodeDataLink\@empty\else\bigskip
                  2289
                          Code and data links:\\ \@acmCodeDataLink\par\bigskip
                  2290
                  2291
                          \ifx\@keywords\@empty\else\bigskip
                  2292
                            Keywords: \@keywords\par
                  2293
                  2294
                          \fi
                          \ifx\@acmContributions\@empty\else\bigskip
                  2295
                            \@acmContributions\par
                  2296
                  2297
                          \ifx\@empty\@authorsaddresses\else\bigskip\@setauthorsaddresses\fi
                  2298
                          \zsaveposy{@ACM@acmcpbox@y}%
                  2299
                       }
                  2300
                  2301 \egroup}
\@specialsection This macro starts sections for proceedings and uses \small for journals
                  2302 \def\@specialsection#1{%
                        \let\@vspace\@vspace@orig
                  2303
                        \let\@vspacer\@vspacer@orig
                  2304
                  2305
                        \ifcase\ACM@format@nr
                        \relax % manuscript
                  2307
                          \par\medskip\small\noindent#1: %
                  2308
                        \or % acmsmall
                  2309
                          \par\medskip\small\noindent#1: %
                        \or % acmlarge
                  2310
                          \par\medskip\small\noindent#1: %
                  2311
                  2312
                        \or % acmtog
                          \par\medskip\small\noindent#1: %
                  2313
                        \or % sigconf
                  2314
                  2315
                          \section*{#1}%
                  2316
                        \or % siggraph
                  2317
                          \section*{#1}%
                  2318
                        \or % sigplan
                           \noindentparagraph*{#1:~}%
                  2319
                        \or % sigchi
                  2320
                          \section*{#1}%
                  2321
                        \or % sigchi-a
                  2322
                          \section*{#1}%
                  2323
                  2324
                        \or % acmengage
                  2325
                          \section*{#1}%
                  2326
                        \or % acmcp
                          \section*{#1}%
                  2328
                        \let\@vspace\@vspace@acm
                  2329
                        \let\@vspacer\@vspacer@acm
                  2330
                  2331 }
```

\@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.

```
2332 \def\@printtopmatter{%
2333 \ifx\@startPage\@empty
```

\fi

```
\else
          2335
                    \setcounter{page}{\@startPage}%
          2336
          2337
                \@tempdima=\ht\mktitle@bx
          2338
                \advance\@tempdima by \dp\mktitle@bx
          2339
                \ifdim\@tempdima>0.9\textheight
          2340
          2341
                  \loop
                     \setbox\@tempboxa=\vsplit \mktitle@bx to 0.9\textheight
          2342
                     \thispagestyle{firstpagestyle}%
          2343
                     \noindent\unvbox\@tempboxa
          2344
                     \clearpage
          2345
                     \@tempdima=\ht\mktitle@bx
          2346
                     \advance\@tempdima by \dp\mktitle@bx
          2347
                  \ifdim\@tempdima>0.9\textheight\repeat
          2348
          2349
                \thispagestyle{firstpagestyle}%
          2350
                \noindent
                \ifcase\ACM@format@nr
          2352
                \relax % manuscript
          2353
                  \box\mktitle@bx\par
          2354
                \or % acmsmall
          2355
                  \box\mktitle@bx\par
          2356
                \or % acmlarge
          2357
          2358
                  \box\mktitle@bx\par
          2359
                \or % acmtog
                  \twocolumn[\box\mktitle@bx]%
          2360
                \or % sigconf
          2361
                  \twocolumn[\box\mktitle@bx]%
          2362
          2363
                \or % siggraph
                  \twocolumn[\box\mktitle@bx]%
          2364
                \or % sigplan
          2365
                  \verb|\twocolumn[\box\mktitle@bx]||
          2366
                \or % sigchi
          2367
                  \twocolumn[\box\mktitle@bx]%
          2368
                \or % sigchi-a
          2369
                  \par\box\mktitle@bx\par\bigskip
          2370
          2371
                \or % acmengage
                  \twocolumn[\box\mktitle@bx]%
          2373
                \or % acmcp
                    \box\mktitle@bx\par
          2374
          2375
                \fi
          2376 }
\@mktitle The title of the article
          2377 \def\@mktitle{%
                \ifcase\ACM@format@nr
          2378
                \relax % manuscript
          2379
                  \@mktitle@i
          2380
                \or % acmsmall
          2381
                  \@mktitle@i
          2382
                \or % acmlarge
          2383
                  \@mktitle@i
          2384
                \or % acmtog
          2385
```

\gdef\@startPage{1}%

```
\@mktitle@i
                2386
                      \or % sigconf
                2387
                        \@mktitle@iii
                2388
                      \or % siggraph
                2389
                        \@mktitle@iii
                2390
                2391
                      \or % sigplan
                2392
                        \@mktitle@iii
                2393
                      \or % sigchi
                2394
                        \@mktitle@iii
                      \or % sigchi-a
                2395
                        \@mktitle@iv
                2396
                      \or % acmengage
                2397
                        \@mktitle@iii
                2398
                      \or % acmcp
                2399
                        \@mktitle@i
                2400
                      \fi
                2401
                2402 }
   \@titlefont The font to typeset the title
                2403 \def\@titlefont{%
                2404
                      \ifcase\ACM@format@nr
                2405
                      \relax % manuscript
                        \LARGE\sffamily\bfseries
                2406
                2407
                      \or % acmsmall
                2408
                        \LARGE\sffamily\bfseries
                2409
                      \or % acmlarge
                        \LARGE\sffamily\bfseries
                2410
                      \or % acmtog
                2411
                        \Huge\sffamily
                2412
                      \or % sigconf
                2413
                        \Huge\sffamily\bfseries
                2414
                      \or % siggraph
                2415
                        \Huge\sffamily\bfseries
                2416
                      \or % sigplan
                2417
                        \Huge\bfseries
                2418
                      \or % sigchi
                        \Huge\sffamily\bfseries
                2420
                      \or % sigchi-a
                2421
                         \Huge\bfseries
                2422
                      \or % acmengage
                2423
                        \Huge\sffamily\bfseries
                2424
                2425
                      \or % acmcp
                        \LARGE\sffamily\bfseries
                2426
                      \fi}
                2427
\@subtitlefont The font to typeset the subtitle
                2428 \def\@subtitlefont{\normalsize
                      \ifcase\ACM@format@nr
                2429
                2430
                      \relax % manuscript
                        \mdseries
                2431
                     \or % acmsmall
                2432
                2433
                        \mdseries
                     \or % acmlarge
                2435
                        \mdseries
```

```
\or % acmtog
              2436
                      \LARGE
              2437
                   \or % sigconf
              2438
                      \LARGE\mdseries
              2439
                   \or % siggraph
              2440
                      \LARGE\mdseries
              2441
                   \or % sigplan
              2442
                      \LARGE\mdseries
              2443
              2444
                   \or % sigchi
                      \LARGE\mdseries
              2445
              2446
                   \or % sigchi-a
              2447
                      \mdseries
                   \or % acmengage
              2448
                      \LARGE\mdseries
              2449
                    \or % acmcp
              2450
                     \mdseries
              2451
                   \fi}
  \@mktitle@i The version of \mktitle for most journals
              2453 \def\@mktitle@i{\hsize=\textwidth
              2454
                   \if@ACM@acmcp
              2455
                     \advance\hsize by -6pc%
              2456
                   \@ACM@title@width=\hsize
              2458
                   \setbox\mktitle@bx=\vbox{\noindent\@titlefont
              2459
                     \parbox[t]{\@ACM@title@width}{\raggedright
              2460
                        \@titlefont\noindent
                        \@title\@translatedtitle%
              2461
                   \ifx\@subtitle\@empty\else
              2462
                     \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}%
              2463
                   \fi}%
              2464
                   \par\bigskip}}%
              2465
 \@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.
              2466 \def\@mktitle@iii{\hsize=\textwidth
                     \setbox\mktitle@bx=\vbox{\@titlefont\centering
              2467
                        \@ACM@title@width=\hsize
              2468
                        \parbox[t]{\@ACM@title@width}{\centering\@titlefont
              2469
              2470
                          \@title\@translatedtitle%
              2471
                          \ifx\@subtitle\@empty\else
                            \par\noindent{\@subtitlefont\@subtitle\@translatedsubtitle}
              2472
                          \fi
              2473
              2474
                        }%
              2475
                        \par\bigskip}}%
 \@mktitle@iv The version of \@mktitle for sigchi-a
              2476 \def\@mktitle@iv{\hsize=\textwidth
                     2477
                        \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
              2478
                        \noindent\@title\@translatedtitle%
              2479
              2480
                      \ifx\@subtitle\@empty\else
```

```
2481 \par\noindent\@subtitle\@translatedsubtitle%
2482 \fi
2483 \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.

```
2484 \newbox\@ACM@commabox
                             2485 \def\@ACM@addtoaddress#1{%
                                        \ifvmode\else
                             2486
                                            \if@ACM@affiliation@obeypunctuation\else
                             2487
                                            \setbox\@ACM@commabox=\hbox{, }%
                                            \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
                                        \fi\fi
                             2490
                             2491
                                       #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 2492 \def\streetaddress#1{\unskip\ignorespaces}
                 \city 2493 \def\postcode#1{\unskip\ignorespaces}
                \state 2494\if@ACM@journal
                                        \def\position#1{\unskip\ignorespaces}
         \postcode 2495
                                        \def\institution#1{\global\@ACM@instpresenttrue
           \country ^{2496}
                                            \unskip~#1\ignorespaces}
                                        \def\city#1{\global\@ACM@citypresenttrue\unskip\ignorespaces}
                                        \def\state#1{\unskip\ignorespaces}
                             2499
                                        \newcommand\department[2][0]{\unskip\ignorespaces}
                             2500
                                        \def\country#1{\StrDel{#1}{ }[\dempa]% }
                             2501
                                            \int \mathbb{C}^{0}
                             2502
                                            \global\@ACM@countrypresenttrue\fi
                             2503
                                            \if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
                             2504
                             2505 \else
                                        2506
                                        \def\institution#1{\global\@ACM@instpresenttrue
                             2507
                                            \if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
                             2508
                                        2509
                                            #2\else#2\par\fi}%
                             2510
                             2511\% \def\streetaddress#1{if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
                             2512 \def\city#1{\global\@ACM@citypresenttrue\@ACM@addtoaddress{#1}}%
                             2513 \let\state\@ACM@addtoaddress
                             2514 \% \def\postcode#1{\i.e.} ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}% Acmounts and the control of the con
                             2516 \fi
     \@mkauthors Typesetting the authors
                             2517 \def\@mkauthors{\begingroup
                             2518 \hsize=\textwidth
                             2519 \ifcase\ACM@format@nr
```

```
\@mkauthors@i
                   2521
                         \or % acmsmall
                   2522
                            \@mkauthors@i
                   2523
                         \or % acmlarge
                   2524
                            \@mkauthors@i
                   2525
                         \or % acmtog
                   2526
                   2527
                            \@mkauthors@i
                   2528
                         \or % sigconf
                            \@mkauthors@iii
                   2529
                   2530
                         \or % siggraph
                            \@mkauthors@iii
                   2531
                         \or % sigplan
                   2532
                            \@mkauthors@iii
                   2533
                          \or % sigchi
                   2534
                            \@mkauthors@iii
                   2535
                          \or % sigchi-a
                   2536
                            \@mkauthors@iv
                   2538
                         \or % acmengage
                   2539
                            \@mkauthors@iii
                   2540
                          \or % acmcp
                            \@mkauthors@i
                   2541
                         \fi
                   2542
                         \endgroup
                   2543
                   2544 }
     \@authorfont Somehow different conferences use different fonts for author names. Why?
                   2545 \def\@authorfont{\Large\sffamily}
\@affiliationfont Font for affiliations
                   {\tt 2546 \backslash def \backslash @affiliation font \{ \backslash normal size \backslash normal font \}}
                       Adjusting fonts for different formats
                   2547 \ifcase\ACM@format@nr
                   2548 \relax % manuscript
                   2549 \or % acmsmall
                   2550 \def\@authorfont{\large\sffamily}
                         \def\@affiliationfont{\small\normalfont}
                   2552 \or % acmlarge
                   2553 \or % acmtog
                   2554 \def\@authorfont{\LARGE\sffamily}
                   2555 \def\@affiliationfont{\large}
                   2556 \or % sigconf
                         \def\@authorfont{\LARGE}
                   2557
                         \def\@affiliationfont{\large}
                   2558
                   2559 \or % siggraph
                   2560 \def\@authorfont{\normalsize\normalfont}
                   2561 \def\@affiliationfont{\normalsize\normalfont}
                   2562 \or % sigplan
                   2563 \def\@authorfont{\Large\normalfont}
                         \def\@affiliationfont{\normalsize\normalfont}
                   2564
                   2565 \or % sigchi
                         \def\@authorfont{\bfseries}
                   2566
                         \def\@affiliationfont{\mdseries}
```

\relax % manuscript

```
2568 \or % sigchi-a
                             \def\@authorfont{\bfseries}
                        2569
                             \def\@affiliationfont{\mdseries}
                        2570
                        2571 \or % acmengage
                             \def\@authorfont{\LARGE}
                        2572
                            \def\@affiliationfont{\large}
                        2574 \or % acmcp
                             \def\@authorfont{\large\sffamily}
                             \def\@affiliationfont{\small\normalfont}
                        2577 \fi
 \@typeset@author@line At this point we have \@currentauthors and \@currentaffiliations. We typeset
                        them in the journal style
                        2578 \def\@typeset@author@line{%
                        2579
                             \andify\@currentauthors\par\noindent
                        2580
                             \@currentauthors\def\@currentauthors{}%
                        2581
                             \ifx\@currentaffiliations\@empty\else
                               \andify\@currentaffiliations
                        2582
                                  \unskip, {\@currentaffiliations}\par
                        2583
                        2584
                             \fi
                             \def\@currentaffiliations{}}
   \if@ACM@instpresent Whether the given affiliation has institution
                        2586 \newif\if@ACM@instpresent
                        2587 \@ACM@instpresenttrue
   \if@ACM@citypresent Whether the given affiliation has city
                        2588 \newif\if@ACM@citypresent
                        2589 \@ACM@citypresenttrue
\if@ACM@countrypresent Whether the given affiliation has country
                        2590 \newif\if@ACM@countrypresent
                        2591 \@ACM@countrypresenttrue
      \@ACM@resetaffil Reset affiliation flags
                        2592 \def\@ACM@resetaffil{%
                             \global\@ACM@instpresentfalse
                             \global\@ACM@citypresentfalse
                             \global\@ACM@countrypresentfalse
                        2595
                        2596 }
      \@ACM@checkaffil Check affiliation flags
                        2597 \def\@ACM@checkaffil{%
                             \if@ACM@instpresent\else
                            \ClassWarningNoLine{\@classname}{No institution present for an affiliation}%
                        2599
                        2600
                             \if@ACM@citypresent\else
                        2601
                             \ClassWarningNoLine{\@classname}{No city present for an affiliation}%
                        2602
                        2603
                             \if@ACM@countrypresent\else
                        2604
                             \ClassError{\@classname}{No country present for an affiliation}{ACM
                        2605
                               requires each author to indicate their country using country macro.}%
                        2606
                        2607
                        2608 }
```

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

```
2609 \def\@mkauthors@i{%
                                                            \def\@currentauthors{}%
                                               2610
                                                            \def\@currentaffiliations{}%
                                               2611
                                                            \verb|\global\let\and\@typeset@author@line||
                                               2612
                                                            \def\@author##1{%
                                               2613
                                                                \ifx\@currentauthors\@empty
                                               2614
                                                                      \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
                                               2615
                                               2616
                                                                        \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
                                                                \fi
                                               2618
                                               2619
                                                                 \def\email##1##2{}%
                                               2620
                                                            \def\affiliation##1##2{%
                                               2621
                                                                 2622
                                                                        \ifx\@currentaffiliations\@empty
                                               2623
                                                                               \gdef\@currentaffiliations{%
                                               2624
                                                                                    \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                               2625
                                                                                    \setkeys{@ACM@affiliation@}{##1}%
                                               2626
                                                                                    \@ACM@resetaffil
                                               2627
                                                                                    \@affiliationfont##2\@ACM@checkaffil}%
                                               2628
                                               2629
                                                                        \else
                                               2630
                                                                             \g@add to @macro {\current affiliations} {\current affiliations} \label{thm:continuous} \
                                               2631
                                                                                  \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                                                                  \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                                               2632
                                                                                  ##2\@ACM@checkaffil}%
                                               2633
                                                                      \fi
                                               2634
                                               2635
                                                                    \global\let\and\@typeset@author@line}%
                                               2636
                                                            \if@ACM@acmcp
                                               2637
                                                                 \advance\hsize by -6pc%
                                               2638
                                               2639
                                                            \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par\medskip
                                               2640
                                                                \noindent\addresses\@typeset@author@line
                                               2641
                                                               \par\medskip}%
                                               2642
                                               2643 }
            \@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
                                               2644 \newbox\author@bx
              \author@bx@wd The width of the author box
                                                2645 \newdimen\author@bx@wd
            \author@bx@sep The separation between author boxes
                                               2646 \newskip\author@bx@sep
                                               2647 \author@bx@sep=1pc\relax
\@typeset@author@bx Typesetting the box with authors. Note that in sigchi-a the box is not centered.
```

 ${\tt 2648 \ def\ @typeset@author@bx{\ bgroup\ hsize=\ author@bx@wd}}$

```
2649 \def\and{\par}\normalbaselines
2650 \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
2651 \@authorfont\@currentauthors\par\@affiliationfont
2652 \@currentaffiliation}\egroup
2653 \box\author@bx\hspace{\author@bx@sep}%
2654 \gdef\@currentauthors{}%
2655 \gdef\@currentaffiliation{}}
```

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

2656 \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
2657
     \advance\author@bx@wd by -\author@bx@sep\relax
2658
     \ifnum\@ACM@authorsperrow>0\relax
2659
       \divide\author@bx@wd by \@ACM@authorsperrow\relax
2660
     \else
2661
       \ifcase\num@authorgroups
2662
2663
       \relax % 0?
       \or % 1=one author per row
2664
       \or % 2=two authors per row
2665
          \divide\author@bx@wd by \num@authorgroups\relax
       \or % 3=three authors per row
2667
          2668
       \or % 4=two authors per row (!)
2669
          \divide\author@bx@wd by 2\relax
2670
       \else % three authors per row
2671
          \divide\author@bx@wd by 3\relax
2672
       \fi
2673
2674
     \fi
     \advance\author@bx@wd by -\author@bx@sep\relax
Now, parsing of \addresses:
     \gdef\@currentauthors{}%
     \gdef\@currentaffiliation{}%
     \def\@author##1{\ifx\@currentauthors\@empty
2678
       \gdef\@currentauthors{\par##1}%
2679
     \else
2680
       \g@addto@macro\@currentauthors{\par##1}%
2681
2682
     \gdef\and{}}%
2683
     \def\email##1##2{\ifx\@currentaffiliation\@empty
2684
       \gdef\@currentaffiliation{\bgroup
2685
         \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2686
2687
       \g@addto@macro\@currentaffiliation{\par\bgroup
2688
         \mathchardef\UrlBreakPenalty=10000\nolinkurl{##2}\egroup}%
2689
     \fi}%
2690
     \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2691
       \gdef\@currentaffiliation{%
2692
         \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2693
         \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2694
```

```
##2\@ACM@checkaffil}%
2695
     \else
2696
        \g@addto@macro\@currentaffiliation{\par
2697
          \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
2698
          \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
2699
          ##2\@ACM@checkaffil}%
2700
     \fi
2701
     \global\let\and\@typeset@author@bx
2702
2703 }%
Actual typesetting is done by the \and macro:
     \hsize=\textwidth
2704
     \global\setbox\mktitle@bx=\vbox{\noindent
2705
       \unvbox\mktitle@bx\par\medskip\leavevmode
2706
2707
       \lineskip=1pc\relax\centering\hspace*{-1em}%
       \addresses\let\and\@typeset@author@bx\and\par\bigskip}}
2708
```

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

```
2709 \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
2710
     \advance\author@bx@wd by -\author@bx@sep\relax
2711
     \ifnum\@ACM@authorsperrow>0\relax
2712
       \divide\author@bx@wd by \@ACM@authorsperrow\relax
2713
     \else
2714
2715
       \ifcase\num@authorgroups
       \relax % 0?
       \or % 1=one author per row
2717
       \else % 2=two authors per row
2718
          \divide\author@bx@wd by 2\relax
2719
       \fi
2720
     \fi
2721
     \advance\author@bx@wd by -\author@bx@sep\relax
2722
Now, parsing of \addresses:
     \gdef\@currentauthors{}%
2723
     \gdef\@currentaffiliation{}%
2724
     \def\@author##1{\ifx\@currentauthors\@empty
2725
       \gdef\@currentauthors{\par##1}%
2726
     \else
2727
       \g@addto@macro\@currentauthors{\par##1}%
2728
     \fi
2729
     2730
     \def\email##1##2{\ifx\@currentaffiliation\@empty
2731
2732
       \gdef\@currentaffiliation{\nolinkurl{##2}}%
     \else
2733
       \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
2734
     \fi}%
2735
     \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
2736
       \gdef\@currentaffiliation{%
2737
```

```
\setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                           2738
                                                              \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                                           2739
                                                              ##2\@ACM@checkaffil}%
                                           2740
                                                     \else
                                           2741
                                                          \g@addto@macro\@currentaffiliation{\par
                                           2742
                                                              \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
                                           2743
                                                              \setkeys{@ACM@affiliation@}{##1}\@ACM@resetaffil
                                           2744
                                                              ##2\@ACM@checkaffil}%
                                           2745
                                                     \fi
                                           2746
                                                      \global\let\and\etypeset@author@bx}%
                                           2747
                                           2748 %
                                           Actual typesetting is done by the \and macro
                                                          \bgroup\hsize=\columnwidth
                                           2749
                                           2750
                                                          \par\raggedright\leftskip=\z@
                                                          \lineskip=1pc\noindent
                                           2751
                                                         \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}
                                           2752
\@mkauthorsaddresses Typesetting authors' addresses in the footnote style
                                           2753 \def\@mkauthorsaddresses{%
                                                     \ifnum\num@authors>1\relax
                                                     Authors' \else Author's \fi
                                                     \ifnum\num@authorgroups>1\relax
                                           2756
                                           2757
                                                     addresses: \else address: \fi
                                           2758
                                                     \bgroup
                                                      \def\streetaddress##1{\unskip, ##1}%
                                           2759
                                                      \def\postcode##1{\unskip, ##1}%
                                           2760
                                                     \def\position##1{\unskip\ignorespaces}%
                                           2761
                                                      \gdef\@ACM@institution@separator{, }%
                                           2762
                                                    \def\institution##1{\unskip\@ACM@institution@separator ##1\gdef\@ACM@institution@separator{ and }
                                           2763
                                           2764
                                                     \def\city##1{\unskip, ##1}%
                                                      \def\state##1{\unskip, ##1}%
                                                      \renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
                                           2766
                                           2767
                                                      \def\country##1{\unskip, ##1}%
                                                      \def\and{\unskip; \gdef\@ACM@institution@separator{, }}%
                                           2768
                                                      \def\@author##1{##1}%
                                           2769
                                                     \def\email##1##2{\unskip, \nolinkurl{##2}}%
                                           2770
                                                      \addresses
                                           2771
                                                     \egroup}
                                           2772
                                           2773 \AtEndDocument{\if@ACM@nonacm\else\if@ACM@journal
                                                     \ifx\@authorsaddresses\@empty
                                           2775
                                                      \ClassWarningNoLine{\@classname}{Authors'
                                                         addresses are mandatory for ACM journals}%
                                          2776
                                                     \fi\fi\fi\
                                           2777
            \@setaddresses This is an amsart macro that we do not need.
                                           2778 \def\@setaddresses{}
       \@authornotemark Adding a footnote mark to authors. This version adds a "normal" footnote mark.
                                           2779 \def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}
      \@@authornotemark Adding a footnote mark to authors with a given number
                                           2780 \end{converse} $$ 2780 \end{converse}
```

```
\@mkteasers Typesetting the teasers
                                                2781 \def\@mkteasers{%
                                                2782
                                                           \ifx\@teaserfigures\@empty\else
                                                2783
                                                               \def\@teaser##1{\par\bigskip\bgroup
                                                2784
                                                                    \captionsetup{type=figure}##1\egroup\par}
                                                2785
                                                               \global\setbox\mktitle@bx=\vbox{\noindent\unvbox\mktitle@bx\par
                                                2786
                                                                    \noindent\@Description@presentfalse
                                                2787
                                                                    \@teaserfigures\par\if@Description@present\else
                                                2788
                                                                          \global\@undescribed@imagestrue
                                                                          \verb|\ClassWarning{\@classname}| A possible image without| \\
                                                2789
                                                                              description}\fi
                                                2790
                                                               \medskip}%
                                                2791
                                                          \fi}
                                                2792
                    \@mkabstract Typesetting the abstract
                                                2793 \def\@mkabstract{\bgroup
                                                           \ifx\@abstract\@lempty\else
                                                           {\phantomsection\addcontentsline{toc}{section}{\abstractname}%
                                                2796
                                                               \if@ACM@iournal
                                                                      \everypar{\setbox\z@\lastbox\everypar{}}\small
                                                2797
                                                2798
                                                               \else
                                                2799
                                                                    \section*{\abstractname}%
                                                2800
                                                2801
                                                             \ignorespaces\@abstract\par}%
                                                          \fi\egroup}
                                                2802
\@mktranslatedabstract Typesetting a translated abstract
                                                2803 \def\@mktranslatedabstract#1{\selectlanguage{#1}%
                                                               \if@ACM@journal
                                                2804
                                                2805
                                                                      \everypar{\setbox\z@\lastbox\everypar{}}\small
                                                               \else
                                                2806
                                                2807
                                                                      \section*{\abstractname}%
                                                               \fi
                                                2808
                                                2809
                                                             \ignorespaces}
              \@mkbibcitation Print the bibcitation format
                                                2810 \def\@mkbibcitation{\bgroup
                                                2811
                                                          \let\@vspace\@vspace@orig
                                                          \let\@vspacer\@vspacer@orig
                                               2812
                                                         \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
                                                2813
                                                           \def\footnotemark{}%
                                                2814
                                                           \def\\{\unskip{} \ignorespaces}%
                                                2815
                                                           \def\footnote{\ClassError{\@classname}{Please do not use footnotes
                                                2816
                                                                    inside a \string\title{} or \string\author{} command! Use
                                                2817
                                                                    \string\titlenote{} or \string\authornote{} instead!}}%
                                                2818
                                                           \def\@article@string{\ifx\@acmArticle\@empty{\ }\else,
                                                2819
                                                               Article \@acmArticle \ \fi}%
                                                2820
                                                           \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
                                                2821
                                                2822
                                                           \noindent\bgroup
                                                               \def \ 
                                                2823
                                                          \ifx\@subtitle\@empty. \else: \@subtitle. \fi
                                                2824
                                                          \if@ACM@nonacm\else
                                                2825
                                                               % The 'nonacm' option disables 'printacmref' by default,
                                                2826
                                                               % and the present \@mkbibcitation definition is never used
                                                2827
```

```
% in this case. The conditional remains useful if the user
                        2828
                               % explicitly sets \settopmatter{printacmref=true}.
                        2829
                               \if@ACM@journal@bibstrip
                        2830
                                  \textit{\@journalNameShort}
                        2831
                                  \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
                        2832
                                  \ref{TotPages}~\@pages@word.
                        2833
                        2834
                                  In \textit{\@acmBooktitle}%
                        2835
                                  \ifx\@acmEditors\@empty\textit{.}\else
                        2836
                                    2837
                                  \fi\
                        2838
                                  ACM, New York, NY, USA%
                        2839
                                    \@article@string\unskip, \ref{TotPages}~\@pages@word.
                        2840
                               \fi
                        2841
                             \fi
                        2842
                             \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
                        2844 \par\egroup}
    \@printendtopmatter End the top matter
                        2845 \def\@printendtopmatter{%
                             \let\@vspace\@vspace@orig
                        2846
                             \let\@vspacer\@vspacer@orig
                        2847
                             \par\bigskip
                        2848
                             \let\@vspace\@vspace@acm
                             \let\@vspacer\@vspacer@acm
                        2850
                        2851
                             }
           \@setthanks We redefine \setthanks using \long
                        2852 \def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
  \@setauthorsaddresses
                        2853 \def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
\@typesetengagemetadata Typesetting special metadata for ACM Engage
                        2854 \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:
                        2857 \RequirePackage{fancyhdr}
 \ACM@restore@pagestyle The following code by Ross Moore protects against changes by the totpages package:
                        2858 \let\ACM@ps@plain\ps@plain
                        2859 \let\ACM@ps@myheadings\ps@myheadings
                        2860 \let\ACM@ps@headings\ps@headings
                        2861 \def\ACM@restore@pagestyle{%
                             \let\ps@plain\ACM@ps@plain
                        2862
                             \let\ps@myheadings\ACM@ps@myheadings
                             \let\ps@headings\ACM@ps@headings}
                        2865 \AtBeginDocument{\ACM@restore@pagestyle}
```

```
\ACM@linecount@bx This is the box displayed in review mode
                  2866 \if@ACM@review
                        \newsavebox{\ACM@linecount@bx}
                  2867
                  2868
                        \newlength\ACM@linecount@bxht
                        \newcount\ACM@linecount
                  2869
                  2870
                        \ACM@linecount\@ne\relax
                  2871
                        \def\ACM@mk@linecount{%
                          2872
                  2873
                              \normalsize
                              \setlength{\ACM@linecount@bxht}{0pt}%
                  2874
                              \label{loop{color{red}\scriptsize} \label{loop{color{red}\scriptsize}} \\
                  2875
                              \global\advance\ACM@linecount by \@ne
                  2876
                              \addtolength{\ACM@linecount@bxht}{\baselineskip}%
                  2877
                              \ifdim\ACM@linecount@bxht<\textheight\repeat
                  2878
                              {\color{red}\scriptsize\the\ACM@linecount}\hfill
                  2879
                  2880
                              \global\advance\ACM@linecount by \@ne}}}
                  2881 \fi
 \ACM@linecountL How to display the box on the left
                  2882 \def\ACM@linecountL{%
                       \if@ACM@review
                  2884
                        \ACM@mk@linecount
                  2885
                       \begin{picture}(0,0)%
                  2886
                          \t(-26, -22){\t(ACM@linecount@bx)}%
                  2887
                        \end{picture}%
                       \fi}
                  2888
 \ACM@linecountR How to display the box on the right. In one column formats we do not step the numbers.
                  2889 \def\ACM@linecountR{%
                       \if@ACM@review
                  2890
                          \ifcase\ACM@format@nr
                  2891
                          \relax % manuscript
                  2892
                               \relax
                  2893
                             \or % acmsmall
                  2894
                               \relax
                  2895
                             \or % acmlarge
                  2897
                               \relax
                  2898
                             \or % acmtog
                                \ACM@mk@linecount
                  2899
                             \or % sigconf
                  2900
                                \ACM@mk@linecount
                  2901
                             \or % siggraph
                  2902
                                \ACM@mk@linecount
                  2903
                             \or % sigplan
                  2904
                                \ACM@mk@linecount
                  2905
                             \or % sigchi
                  2906
                  2907
                                \ACM@mk@linecount
                  2908
                             \or % sigchi-a
                  2909
                                \ACM@mk@linecount
```

\or % acmengage

\or % acmcp

\relax

\fi

\ACM@mk@linecount

2910

2911

2912

2913

```
\begin{picture}(0,0)%
                   2915
                             \put(20,-22){\usebox{\ACM@linecount@bx}}%
                   2916
                            \end{picture}%
                   2917
                        \fi}
                   2918
   \ACM@timestamp The timestamp system
                   2919 \if@ACM@timestamp
                        % Subtracting 30 from \time gives us the effect of rounding down despite
                        % \numexpr rounding to nearest
                   2921
                        \newcounter{ACM@time@hours}
                   2922
                        \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
                   2923
                        \newcounter{ACM@time@minutes}
                   2924
                   2925
                        \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
                        \newcommand\ACM@timestamp{%
                   2926
                           \footnotesize%
                   2927
                   2928
                           \ifx\@acmSubmissionID\@empty\relax\else
                   2929
                          Submission ID: \@acmSubmissionID.{ }%
                   2930
                          \fi
                           \t \ \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
                   2931
                           \label{two@digits{theACM@time@hours}: two@digits{theACM@time@minutes}{.} \% $$
                   2932
                          Page \thepage\ of \@startPage--\pageref*{TotPages}.%
                   2933
                   2934
                   2935 \fi
   \@shortauthors Even if the author redefined \shortauthors, we do not print it in the headers when in
                   anonymous mode:
                   2936 \def\@shortauthors{%
                   2937
                        \if@ACM@anonymous
                   2938
                           \ifx\@acmSubmissionID\@empty\else Submission Id: \@acmSubmissionID\fi
                   2939
                        \else\shortauthors\fi}
                   2940
   \@headfootfont The font to typeset header and footer text.
                   2941 \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
                   2942 \AtBeginDocument{%
                   2943 \fancypagestyle{standardpagestyle}{%
                        \fancyhf{}%
                   2944
                        \renewcommand{\headrulewidth}{\z@}%
                   2945
                        \renewcommand{\footrulewidth}{\z@}%
                   2946
                         \def\@acmArticlePage{%
                   2947
                           \ifx\@acmArticle\empty%
                   2948
                             \if@ACM@printfolios\thepage\fi%
                   2949
                   2950
                           \else%
                   2951
                             \@acmArticle\if@ACM@printfolios:\thepage\fi%
                   2952
                          \fi%
                        }%
                   2953
                         \if@ACM@journal@bibstrip@or@tog
                   2954
                           \ifcase\ACM@format@nr
                   2955
                           \relax % manuscript
                   2956
                             \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
                   2957
```

```
\fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
2958
         \fancyhead[RE]{\@shortauthors}%
2959
         \fancyhead[LO]{\ACM@linecountL\shorttitle}%
2960
         \if@ACM@nonacm\else%
2961
           \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}
2962
         \fi%
2963
       \or % acmsmall
2964
         \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticlePage}%
2965
         \fancyhead[RO]{\@headfootfont\@acmArticlePage}%
2966
         \fancyhead[RE]{\@headfootfont\@shortauthors}%
2967
         \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
2968
         \if@ACM@nonacm\else%
2969
         \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2970
           \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2971
2972
       \or % acmlarge
2973
         \fancyhead[LE]{\ACM@linecountL\@headfootfont
2974
         \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
         \fancyhead[LO]{\ACM@linecountL}%
2976
         \fancyhead[RO]{\@headfootfont
2977
           \shorttitle\quad\textbullet\quad\@acmArticlePage}%
2978
         \if@ACM@nonacm\else%
2979
        \fancyfoot[RO,LE]{\footnotesize \@journalNameShort, Vol. \@acmVolume, No.
2980
          \@acmNumber, Article \@acmArticle. Publication date: \@acmPubDate.}%
2981
2982
2983
       \or % acmtog
         \fancyhead[LE]{\ACM@linecountL\@headfootfont
2984
           \@acmArticlePage\quad\textbullet\quad\@shortauthors}%
2985
         \fancyhead[LO]{\ACM@linecountL}%
2986
2987
         \fancyhead[RE]{\ACM@linecountR}%
         \fancyhead[RO]{\@headfootfont
2988
           \shorttitle\quad\textbullet\quad\@acmArticlePage\ACM@linecountR}%
2989
         \if@ACM@nonacm\else
2990
           \if@ACM@journal@bibstrip
2991
             \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
2992
               Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
2993
               Publication date: \@acmPubDate.}%
2994
             \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
2997
               \acmConference@date, \acmConference@venue.}%
2998
            \fi
         \fi
2999
       \else % Proceedings
3000
         \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3001
         \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3002
         \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3003
         \if@ACM@nonacm
3004
           \fancyhead[LE]{\ACM@linecountL}%
3005
           \fancyhead[RO]{\ACM@linecountR}%
3006
3007
         \else%
3008
           \if@ACM@engage
             3009
               EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi}%
3010
             \footnotemark
3011
```

```
EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3012
              \ACM@linecountR}%
3013
           \else
3014
             \fancyhead[LE]{\ACM@linecountL\@headfootfont\footnotesize
3015
              \acmConference@shortname,
3016
              \acmConference@date, \acmConference@venue}%
3017
             \footnotemark
3018
              \acmConference@shortname,
3019
              \acmConference@date, \acmConference@venue\ACM@linecountR}%
3020
            \fi
3021
         \fi
3022
       \fi
3023
     \else % Proceedings
3024
       \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3025
       \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
3026
       \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
3027
       \if@ACM@nonacm
3028
         \fancyhead[LE]{\ACM@linecountL}%
3030
         \fancyhead[RO]{\ACM@linecountR}%
3031
       \else%
         \if@ACM@engage
3032
           \fancyhead[LE]{\ACM@linecountL\@headfootfont
3033
             3034
           \footnotemark
3035
             EngageCSEdu. \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
3036
3037
             \ACM@linecountR}%
         \else
3038
           \fancyhead[LE]{\ACM@linecountL\@headfootfont
3039
             \acmConference@shortname,
3040
3041
             \acmConference@date, \acmConference@venue}%
           \footnotemark
3042
3043
             \acmConference@shortname,
             \acmConference@date, \acmConference@venue\ACM@linecountR}%
3044
          \fi
3045
       \fi
3046
3047
     \if@ACM@sigchiamode
3048
3049
        \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
3050
3051
     \if@ACM@timestamp
3052
        \fancyfoot[LO,RE]{\ACM@timestamp}
3053
3054
     \if@ACM@acmcp
     \renewcommand{\footrulewidth}{0.1\p@}%
3055
     \fancyheadoffset[L]{46pt}%
3056
     \fancyhead[L]{\makebox[\z@][1]{%
3057
         \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
3058
         \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3059
             \strut\ACM@ArticleType~Article}}}%
3060
3061
       \ACM@linecountL}%
3062
     3063
     \fancyfoot[L,C]{}%
3064
     \fancyfoot[R]{\footnotesize
       \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3065
```

```
\ifx\@acmArticle\@empty\else Article^\@acmArticle\fi\space
              3066
                     3067
                   \fi
              3068
              3069 }%
              3070 \pagestyle{standardpagestyle}
    \@folio@wd Folio blob width, height, offsets and max number
    \@folio@ht
\@fo\%fo\ipplet The macro to typeset the folio blob.
3072 \AtBeginDocument{%
              3073 \fancypagestyle{firstpagestyle}{%
              3074
                   \fancyhf{}%
                   \renewcommand{\headrulewidth}{\z@}%
              3075
                   \renewcommand{\footrulewidth}{\z@}%
                   \if@ACM@journal@bibstrip@or@tog
                     \ifcase\ACM@format@nr
              3078
              3079
                     \relax % manuscript
                       \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
              3080
                       \fancyhead[R]{\@acmBadgeR}%
              3081
                       \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
              3082
                       \if@ACM@nonacm\else%
              3083
              3084
                         \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
                       \fi%
              3085
                     \or % acmsmall
              3086
                       \if@ACM@nonacm\else%
              3087
                      3088
                         \@acmNumber, Article \@acmArticle. Publication date:
              3089
                         \@acmPubDate.}%
              3090
                       \fi%
              3091
                       \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
              3092
                       \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
              3093
                       \fancyhead[RO]{\@acmBadgeR}%
              3094
                       \fancyhead[RE]{\@acmBadgeR}%
              3095
                     \or % acmlarge
              3096
                       \if@ACM@nonacm\else%
                      \@acmNumber, Article \@acmArticle. Publication date:
              3099
              3100
                         \@acmPubDate.}%
              3101
                       \fi%
                       \fancyhead[RO]{\@acmBadgeR}%
              3102
                       \fancyhead[RE]{\@acmBadgeR}%
              3103
                       \fancyhead[LE]{\ACM@linecountL\@acmBadgeL}%
              3104
                       \fancyhead[LO]{\ACM@linecountL\@acmBadgeL}%
              3105
              3106
                     \or % acmtog
                       \if@ACM@nonacm\else%
              3107
                         \if@ACM@journal@bibstrip
              3108
              3109
                          \fancyfoot[RO,LE]{\footnotesize \@journalNameShort,
              3110
                            Vol. \@acmVolume, No.~\@acmNumber, Article \@acmArticle.
              3111
                            Publication date: \@acmPubDate.}%
              3112
                         \else
                          \fancyfoot[RO,LE]{\footnotesize \acmConference@shortname,
              3113
```

```
\acmConference@date, \acmConference@venue.}%
3114
           \fi
3115
         \fi%
3116
         \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3117
         \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3118
       \else % Conference proceedings
3119
         \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3120
         \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3121
         \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3122
       \fi
3123
3124
     \else
       \fancyhead[L]{\ACM@linecountL\@acmBadgeL}%
3125
       \fancyhead[R]{\@acmBadgeR\ACM@linecountR}%
3126
       \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
3127
3128
     \if@ACM@timestamp
3129
       \ifnum\ACM@format@nr=0\relax % Manuscript
3130
       \fancyfoot[LO,RE]{\ACM@timestamp\quad
3131
         \if@ACM@nonacm\else
3132
           \footnotesize Manuscript submitted to ACM
3133
         \fi}
3134
       \else
3135
       \fancyfoot[LO,RE]{\ACM@timestamp}
3136
       \fi
3137
3138
     \if@ACM@acmcp
3139
3140
     \renewcommand{\footrulewidth}{0.1\p@}%
     \fancyheadoffset[L]{46pt}%
3141
     \frac{L}{\makebox[\z@][1]{\%}}
3142
3143
         \raisebox{-\dimexpr(0.2\textheight*(\ACM@ArticleType@nr-2))}{%
         \rotatebox{90}{\colorbox{@ACM@Article@color}{\color{white}%
3144
             \strut\ACM@ArticleType~Article}}}}%
3145
       \ACM@linecountL\@acmBadgeL}%
3146
     3147
     \fancyfoot[L,C]{}%
3148
     \fancyfoot[R]{\footnotesize
3149
       \@journalName, Volume~\@acmVolume, Issue~\@acmNumber,
3150
       \ifx\@acmArticle\@empty\else Article~\@acmArticle\fi\space
       \fi
3153
3154 }}
```

3.23 Sectioning

 $\verb|\ACM@NRadjust| Ross Moore's macro. \\$

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.

```
3155 \def\ACM@NRadjust#1{%
                                3156 \begingroup
                                     \expandafter\ifx\csname Sectionformat\endcsname\relax
                                3157
                                     % do nothing when \Sectionformat is unknown
                                3158
                                      \def\next{\endgroup #1}%
                                3159
                                3160 \else
                                3161
                                     \def\next{\endgroup
                                      \let\realSectionformat\Sectionformat
                                      \def\ACM@sect@format@{#1}%
                                      \let\Sectionformat\ACM@NR@adjustedSectionformat
                                3165 %% next lines added 2018-06-17 to ensure section number is styled
                                      \let\real@adddotafter\@adddotafter
                                3166
                                      \let\@adddotafter\ACM@adddotafter
                                3167
                                      #1{}% imposes the styles, but nullifies \MakeUppercase
                                3168
                                      \let\@adddotafter\real@adddotafter
                                3169
                                3170 }%
                                3171 \fi \next
                                3172 }
\ACM@NR@adjustedSectionformat
                                3173 \def\ACM@NR@adjustedSectionformat#1#2{%
                                3174 \realSectionformat{\ACM@sect@format{#1}}{#2}%
                                3175 \let\Sectionformat\realSectionformat}
                                3176 \DeclareRobustCommand{\ACM@sect@format}{\ACM@sect@format@}
                                3177 \def\ACM@sect@format@null#1{#1}
                                3178 \let\ACM@sect@format@\ACM@sect@format@null
                                3179 \AtBeginDocument{%
                                3180 \expandafter\ifx\csname LTX@adddotafter\endcsname\relax
                                3181 \let\LTX@adddotafter\@adddotafter
                                3182 \fi
                                3183 }
             \ACM@adddotafter
                                {\tt 3184 \setminus ACM@adddotafter\#1\{\setminus ifx \land velax\#1 \land velax \in LTX@adddotafter\{\#1\} \land ifi\}}
                                   Sectioning is different for different levels
                                3185 \renewcommand\section{\@startsection{section}{1}{\z@}%
                                3186 {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
                                3187 {.25\baselineskip}%
                                3188 {\ACM@NRadjust\@secfont}}
                                3189 \renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
                                3190 {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
```

```
3191 {.25\baselineskip}%
                                                              3192 {\ACM@NRadjust\@subsecfont}}
                                                              \{-.5\} {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
                                                                           \{-3.5\p0\}\%
                                                              3195
                                                                          {\ACM@NRadjust{\@subsubsecfont\@adddotafter}}}
                                                              3196
                                                              3197 \renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
                                                                             {-.5\baselineskip \eqnus -2\p@ \eqnus -.2\p@}%
                                                                             \{-3.5\p0\}\%
                                                              3199
                                                                           {\ACM@NRadjust{\@parfont\@adddotafter}}}
                                                              3200
                                                              3201 \newcommand \noindentparagraph { \@startsection { paragraph } { 4 } { \z@} \%
                                                                             {-.5\baselineskip \eqnus -2\p@ \eqnus -.2\p@}%
                                                              3202
                                                                             \{-3.5\p0\}%
                                                              3203
                                                                             {\ACM@NRadjust{\@parfont}}}
                                                              3204
                                                              3205
                                                              3206 \renewcommand\part{\@startsection{part}{9}{\z@}%
                                                                             {-10\p@ \ensuremath{\mbox{\mbox{$0$}}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensuremath{\mbox{$0$}}\ensu
                                                                             {4\p@}%
                                                              3208
                                                                             {\ACM@NRadjust\@parfont}}
                                                              3209
\section@raggedright Special version of \raggedright compatible with \MakeUppercase
                                                              3210 \def\section@raggedright{\@rightskip\@flushglue
                                                              3211
                                                                            \rightskip\@rightskip
                                                                             \leftskip\z@skip
                                                              3212
                                                                            \parindent\z@}
                                \@secfont Fonts for sections etc. are different for different formats.
                       \@subsecfont 3214\def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
              \verb|\def| @ subsubsection @ 13215 \verb|\def| @ subsection @ 13215 \verb|\def| & sffamily \verb|\def| & section @ 13215 \verb|\def| & sect
                                \@parfont 3216 \def\@subsubsecfont{\sffamily\itshape}
                                                              3217 \def\@parfont{\itshape}
                                                              3218 \setcounter{secnumdepth}{3}
                                                              3219 \ifcase\ACM@format@nr
                                                              3220 \relax % manuscript
                                                              3221 \or % acmsmall
                                                              3222 \or % acmlarge
                                                              3223 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
                                                              3224 \def\@subsecfont{\sffamily\large\section@raggedright}
                                                              3225 \or % acmtog
                                                              3226 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
                                                              3227 \def\@subsecfont{\sffamily\large\section@raggedright}
                                                              3228 \or % sigconf
                                                              3229 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
                                                              3230 \def\@subsecfont{\bfseries\Large\section@raggedright}
                                                              3231 \or % siggraph
                                                              3233 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
                                                              3234 \or % sigplan
                                                              3235 \def\@secfont{\bfseries\Large\section@raggedright}
                                                              3236 \def\@subsecfont{\bfseries\section@raggedright}
                                                              3237 \def\@subsubsecfont{\bfseries\section@raggedright}
                                                              3238 \def\@parfont{\bfseries\itshape}
                                                              3239 \def\@subparfont{\itshape}
                                                              3240 \or % sigchi
```

```
3241 \setcounter{secnumdepth}{1}
                3242 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
                3243 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
                3244 \or % sigchi-a
                3245 \setcounter{secnumdepth}{0}
                3246 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
                3247 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
                3248 \or % acmengage
                3249 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
                3250 \def\@subsecfont{\bfseries\Large\section@raggedright}
                3251 \or %acmcp
                3252 \fi
  \@adddotafter Add punctuation after a sectioning command
                3253 \def\@adddotafter#1{#1\@addpunct{.}}
\@addspaceafter Add space after a sectioning command
                3254 \def\@addspaceafter#1{#1\@addpunct{\enspace}}
                3255 \if@ACM@acmcp
                3256 \setcounter{secnumdepth}{-1}%
                3257 \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.

 $3258 \providecommand*\@dotsep{4.5}$

3.25 Theorems

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

3259 \def\@acmplainbodyfont{\itshape}

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

3260 \def\@acmplainindent{\parindent}

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

 $3261 \ensuremath{\ensuremath$

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

3262 \def\@acmplainnotefont{\@empty}

Customization of the acmplain theorem style:

3263\ifcase\ACM@format@nr 3264\relax % manuscript 3265\or % acmsmall 3266\or % acmlarge 3267\or % acmtog 3268\or % sigconf

```
3269 \or % siggraph
                         3270 \or % sigplan
                         3271 \def\@acmplainbodyfont{\itshape}
                         3272 \def\@acmplainindent{\z@}
                         3273 \def\@acmplainheadfont{\bfseries}
                         3274 \def\@acmplainnotefont{\normalfont}
                         3275 \or % sigchi
                         3276 \or % sigchi-a
                         3277 \or % acmengage
                         3278 \or % acmcp
                         3279 \fi
               acmplain The acmplain theorem style
                         3280 \newtheoremstyle{acmplain}%
                              {.5\baselineskip\@plus.2\baselineskip
                                 \@minus.2\baselineskip}% space above
                         3282
                              {.5\baselineskip\@plus.2\baselineskip
                         3283
                                 \@minus.2\baselineskip}% space below
                         3284
                              {\@acmplainbodyfont}% body font
                         3285
                              {\@acmplainindent}% indent amount
                         3286
                              {\@acmplainheadfont}% head font
                         3287
                         3288 {.}% punctuation after head
                              {.5em}% spacing after head
                         3289
                             {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec
\@acmdefinitionbodyfont The font to typeset the body of the acmdefinition theorem style.
                         3291 \def\@acmdefinitionbodyfont{\normalfont}
  \@acmdefinitionindent The amount to indent the acmdefinition theorem style.
                         3292 \def\@acmdefinitionindent{\parindent}
\@acmdefinitionheadfont The font to typeset the head of the acmdefinition theorem style.
                         3293 \def\@acmdefinitionheadfont{\itshape}
\@acmdefinitionnotefont The font to typeset the note of the acmdefinition theorem style.
                         3294 \def\@acmdefinitionnotefont{\@empty}
                            Customization of the acmdefinition theorem style:
                         3295 \ifcase\ACM@format@nr
                         3296 \relax % manuscript
                         3297 \or % acmsmall
                         3298 \or % acmlarge
                         3299 \or % acmtog
                         3300 \or % sigconf
                         3301 \or % siggraph
                         3302 \or % sigplan
                         3303 \def\@acmdefinitionbodyfont{\normalfont}
                         3304 \def\@acmdefinitionindent{\z@}
                         3305 \def\@acmdefinitionheadfont{\bfseries}
                         3306 \def\@acmdefinitionnotefont{\normalfont}
                         3307 \or % sigchi
                         3308 \or % sigchi-a
                         3309 \or % acmengage
                         3310 \or % acmcp
                         3311\fi
```

acmdefinition The acmdefinition theorem style

```
3312 \newtheoremstyle{acmdefinition}%
3313
     {.5\baselineskip\@plus.2\baselineskip
        \@minus.2\baselineskip}% space above
     {.5\baselineskip\@plus.2\baselineskip
3316
        \@minus.2\baselineskip}% space below
3317
     {\@acmdefinitionbodyfont}% body font
     {\@acmdefinitionindent}% indent amount
3318
     {\@acmdefinitionheadfont}% head font
3319
     {.}% punctuation after head
3320
     {.5em}% spacing after head
3321
    {\tilde{4}}\ thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
3322
```

Make acmplain the default theorem style.

```
3323 \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.

```
3324 \AtEndPreamble{%
     \if@ACM@acmthm
     \theoremstyle{acmplain}
     \@ifundefined{theorem}{%
3327
     \newtheorem{theorem}{Theorem}[section]
3328
3329
     \@ifundefined{conjecture}{%
3330
     \newtheorem{conjecture}[theorem]{Conjecture}
3331
3332
     \@ifundefined{proposition}{%
3333
     \newtheorem{proposition}[theorem]{Proposition}
3334
3335
     }{}
     \@ifundefined{lemma}{%
3336
     \newtheorem{lemma}[theorem]{Lemma}
3337
3338
     \@ifundefined{corollary}{%
3339
     \newtheorem{corollary}[theorem]{Corollary}
3340
3341
     }{}
     \theoremstyle{acmdefinition}
3342
     \@ifundefined{example}{%
3343
     \newtheorem{example}[theorem]{Example}
3344
     }{}
3345
     \@ifundefined{definition}{%
3346
     \newtheorem{definition}[theorem]{Definition}
3347
3348
3349
     \fi
     \theoremstyle{acmplain}
3350
3351 }
```

\@proofnamefont The font to typeset the proof name.

```
3352 \def\@proofnamefont{\scshape}
\@proofindent Whether or not to indent proofs.
               3353 \def\@proofindent{\indent}
                  Customization of the proof environment.
               3354 \ifcase\ACM@format@nr
               3355 \relax % manuscript
               3356 \or % acmsmall
               3357 \or % acmlarge
               3358 \or % acmtog
              3359 \or % sigconf
               3360 \or % siggraph
               3361 \or % sigplan
              3362 \def\@proofnamefont{\itshape}
              3363 \def\@proofindent{\noindent}
               3364 \or % sigchi
              3365 \or % sigchi-a
               3366 \or % acmengage
               3367 \or % acmcp
               3368\fi
        proof We want some customization of the proof environment.
```

3369 \renewenvironment{proof}[1][\proofname]{\par

\item[\@proofindent\hskip\labelsep

\popQED\endtrivlist\@endpefalse

\normalfont \topsep6\p@\@plus6\p@\relax

3.26 Balancing columns

\pushQED{\qed}%

\trivlist

3370

3371 3372

3373

3374 3375 }{%

3376 3377 }

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.

{\@proofnamefont #1\@addpunct{.}}]\ignorespaces

```
3378 \AtEndPreamble{%
3379
     \if@ACM@pbalance
3380
       \global\@ACM@balancefalse
       \ifcase\ACM@format@nr
3381
       \relax % manuscript
3382
           \or % acmsmall
3384
           \or % acmlarge
           \or % acmtog
3385
              \RequirePackage{pbalance}%
3386
           \or % sigconf
3387
              \RequirePackage{pbalance}%
3388
           \or % siggraph
3389
              \RequirePackage{pbalance}%
3390
3391
           \or % sigplan
3392
              \RequirePackage{pbalance}%
           \or % sigchi
```

```
\or % sigchi-a
      3395
                 \or % acmengage
      3396
                    \RequirePackage{pbalance}%
      3397
      3398
                 \or % acmcp
      3399
              \fi
      3400
           \fi
            \if@ACM@balance
      3401
              \ifcase\ACM@format@nr
      3402
              \relax % manuscript
      3403
                   \global\@ACM@balancefalse
      3404
                 \or % acmsmall
      3405
                   \global\@ACM@balancefalse
      3406
                 \or % acmlarge
      3407
                   \global\@ACM@balancefalse
      3408
                 \or % acmtog
      3409
                    \RequirePackage{balance}%
      3410
      3411
                 \or % sigconf
                    \RequirePackage{balance}%
      3412
      3413
                 \or % siggraph
                    \RequirePackage{balance}%
      3414
                 \or % sigplan
      3415
                    \RequirePackage{balance}%
      3416
                 \or % sigchi
      3417
                    \RequirePackage{balance}%
      3418
      3419
                 \or % sigchi-a
                    \global\@ACM@balancefalse
      3420
                 \or % acmengage
      3421
      3422
                    \RequirePackage{balance}%
      3423
                 \or % acmcp
                   \global\@ACM@balancefalse
      3424
              \fi
      3425
           \fi
      3426
      3427 }
      3428 \AtEndDocument{%
           \if@ACM@balance
      3430
            \if@twocolumn
            \balance
           \fi\fi}
              Acknowledgments
      3.27
      3433 \newcommand\acksname{Acknowledgments}
\acks This is a comment-like structure
      3434 \specialcomment{acks}{%
           \begingroup
      3435
            \section*{\acksname}
      3436
           \phantomsection\addcontentsline{toc}{section}{\acksname}
      3437
      3438 }{%
```

\RequirePackage{pbalance}%

3394

\acksname

\endgroup

3439 3440 }

```
\grantsponsor We just typeset the name of the sponsor

3441 \def\grantsponsor#1#2#3{#2}

\grantnum

3442 \newcommand\grantnum[3][]{#3%

3443 \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.28 Conditional typesetting

We use the comment package for conditional typesetting:

```
3444 \AtEndPreamble{%
3445 \if@ACM@screen
3446 \includecomment{screenonly}
3447 \excludecomment{printonly}
3448 \else
3449 \excludecomment{screenonly}
3450 \includecomment{printonly}
3451 \fi
3452 \if@ACM@anonymous
3453 \excludecomment{anonsuppress}
3454 \excludecomment{acks}
3455 \else
3456 \includecomment{anonsuppress}
3457 \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'.

```
3458 \newcommand\showeprint[2][arxiv]{%
     \def\@tempa{#1}%
3459
     \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
3460
     \def\@tempb{arxiv}%
3461
     \ifx\@tempa\@tempb\relax
3462
        arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3463
3464
         \def\@tempb{arXiv}%
3465
        \ifx\@tempa\@tempb\relax
3466
           arXiv:\href{https://arxiv.org/abs/#2}{#2}%
3467
3468
         \else
           #1:#2%
3469
       \fi
3470
3471 \fi}
```

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.

```
3472 \def\theindex{\@restonecoltrue\if@twocolumn\@restonecolfalse\fi
3473 \columnseprule\z@ \columnsep 35\p@
3474 \@indextitlestyle
3475 \let\item\@idxitem
```

```
3476 \parindent\z@ \parskip\z@\@plus.3\p@\relax
3477 \raggedright
3478 \hyphenpenalty\@M
3479 \footnotesize}
```

3.31 End of Class

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

```
3480 \let\@vspace@orig=\@vspace
3481 \let\@vspacer@orig=\@vspace
3482 \apptocmd{\@vspace}{\ClassWarning{\@classname}{\string\vspace\space should
3483 only be used to provide space above/below surrounding
3484 objects}}{}{}
3485 \apptocmd{\@vspacer}{\ClassWarning{\@classname}{\string\vspace\space should
3486 only be used to provide space above/below surrounding
3487 objects}}{}{}
3488 \let\@vspace@acm=\@vspace
3489 \let\@vspacer@acm=\@vspace
```

\ACM@origbaselinestretch We produce an error if the user tries to change \baselinestretch

```
3490 \let\ACM@origbaselinestretch\baselinestretch
3491 \AtEndDocument{\ifx\baselinestretch\ACM@origbaselinestretch\else
3492 \ClassError{\@classname}{An attempt to redefine
3493 \string\baselinestretch\space detected. Please do not do this for
3494 ACM submissions!}\fi}
3495 \normalsize\normalfont\frenchspacing
3496 \cappa(class)
```

References

- [1] UK TeX Users Group. UK list of TeX frequently asked questions. https://texfaq.org, 2019.
- [2] Michael Downes and Barbara Beeton. *The amsart, amsproc, and amsbook document classes*. American Mathematical Society, August 2004. http://www.ctan.org/pkg/amslatex.
- [3] Johannes L. Braams and Javier Bezos. *Babel*, 2022. http://www.ctan.org/pkg/babel.
- [4] Cristophe Fiorio. *algorithm2e.sty—package for algorithms*, October 2015. http://www.ctan.org/pkg/algorithm2e.
- [5] Rogério Brito. *The algorithms bundle*, August 2009. http://www.ctan.org/pkg/algorithms.
- [6] Carsten Heinz, Brooks Moses, and Jobst Hoffmann. *The Listings Package*, June 2015. http://www.ctan.org/pkg/listings.
- [7] Simon Fear. *Publication quality tables in LATEX*, April 2005. http://www.ctan.org/pkg/booktabs.
- [8] Association for Computing Machinery. *ACM Visual Identity Standards*, 2007. http://identitystandards.acm.org.
- [9] Axel Sommerfeldt. *The subcaption package*, April 2013. http://www.ctan.org/pkg/subcaption.
- [10] Boris Veytsman, Bern Schandl, Lee Netherton, and C. V. Radhakrishnan. *A package to create a nomenclature*, September 2005. http://www.ctan.org/pkg/nomencl.
- [11] Nicola L. C. Talbot. *User Manual for glossaries.sty* v4.44, December 2019. http://www.ctan.org/pkg/glossaries.
- [12] David Carlisle. *The textcase package*, October 2004. http://www.ctan.org/pkg/textcase.

Change History

1.48	\ccsdesc@parse: Added warning for
General: Added prologue option to	missing concepts 78
xcolor	\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 115
TIOT, TDSCI 36	1.70
Rearranged docs 36	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	acmengage
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	515grupii
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 43
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	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 114
Added macro 54	\grantsponsor: Added macro 114
\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	\@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
$\begin{tabular}{l} \textbf{bibstyle@acmauthoryear: } Added \end{tabular}$	for sigs
macro 44	\@makefnmark: Redefined 49
\bibstyle@acmnumeric: Added	\@mkauthors: TOG now uses the same
macro 44	authors block as other journals 92
\if@ACM@printfolios: Added macro 75	\@mkauthors@ii: Deleted 95

\@mkbibcitation: Added \nobreak 99 Changed format for sigs 99 \acmArticle: The default is now	Documentation typos fixed (thanks to Stephen Spencer)
	\if@ACM@printccs: Typo corrected . 75
\acmMonth: The default must be	
numerical. Closes #50	General: Corrected option natbib
\acmNumber: The default is now	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 114	\@mkabstract: Removed spurious
\grantsponsor: Renamed 114	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
	standardpagestyle: Corrected
v1.18	printfolios (Matthew Fluet) 102
General: Natbib is now the default for	v1.30
all formats	General: Added \frenchspacing 115
\@mkauthors@i: Now we andify	Bibtex style now recognizes https://
affiliations 95	in doi
\@typeset@author@line: Added	Switched to T1: looks like libertine
macro	has problems with \1 in OT1 55
v1.19	Updated IMWUT and PACMPL 60
General: Include 'Abstract',	
'Acknowledgements', and	\department: Added optional
'References' in PDF bookmarks	parameter 92
(Matthew Fluet)	v1.31
Include 'References' in PDF	General: Documentation changes 36
bookmarks (Matthew Fluet) 43	\@additionalaffiliation: Added
\@mkabstract: Include 'Abstract' in	macro
PDF bookmarks (Matthew Fluet) . 99	\@mkbibcitation: Disabled linebreak 99
\acks: Include 'Acknowledgements' in	\@startsection: Added
PDF bookmarks (Matthew Fluet) 113	\tochangmeasure 46
v1.20	Redefined macro 48
	\@textbottom: Redefined 54
•	\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
for Aptara	\lesubsection: Redefined macro 48
v1.23	\l@subsubsection: Redefined macro 49
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
General Corrected (SHOLLCILE bug . 30	General, Added achiant-prefoad-1100K 30

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 92	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 92	
\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
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) . 43
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 115	\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 Istlisting and
\vspace warning99	lstlisting* to prevent spurious
=	space warnings 56
\@printendtopmatter: Deleted	\@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
\maketitle 84	v1.68
\vspace: Preserved old versions as	General: New command for unindent
\@vspace@orig and	paras
\@vspace@orig <u>115</u>	\@specialsection: Deleted grouping
v1.59	altogether
\acmConference: Setting	v1.69
\@ACM@journal@bibstrip 68	General: No dots for unindented
\acmJournal: Setting	paragraphs
\@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
	to Andrew Black) 49
Moved page styles to	v1.72
\AtBeginDocument 102	\author: Added \detokenize
v1.60	(Kuldeep S. Meel)
\@headfootfont: Moved to	\maketitle: Do not andify authors
footnotesize 102	for ndf metadata (Scott Pakin) 84

v1.73	v1.78
General: Patching minted and minted*	\@mkauthors@i: Unboxing
to prevent spurious space	\mktitle@bx 95
warnings	\@mkauthors@iii: Unboxing
\@ACM@checkaffil: Added macro 94	\mktitle@bx 96
\@ACM@resetaffil: Added macro 94	\@mkteasers: Unboxing \mktitle@bx 99
\@mkauthors@i: Check the presence	\@printtopmatter: Added processing
of required elements for	the overflowing title box 88
affiliations 95	\@specialsection: Again suppressed
\@mkauthors@iii: Check the	\vspace warning 88
presence of required elements for	v1.82
affiliations	\anon: Introduced macro 83
\@mkauthors@iv: Check the presence	v1.83
of required elements for	General: Use babel for multilanguage
affiliations 97	papers
\city: Check the presence in affil 92	\@mktitle@i: Added
\country: Check the presence in affil 92	\translatedtitle and
\if@ACM@citypresent: Added macro 94	\translatedtitle and \translatedsubtitle 91
\if@ACM@countrypresent: Added	\@mktitle@iii: Added
macro	\translatedtitle and
\if@ACM@instpresent: Added macro 94	\translatedsubtitle 91
\institution: Check the presence in	\@mktitle@iv: Added
affil	\translatedtitle and
\maketitle: Do not check again the	\translatedsubtitle 91
presense of address fields 84	\@mktranslatedabstract: Added
v1.74	macro
General: Changed the order of font	\@mktranslatedkeywords: Added
loading	macro 71
v1.75	\@translatedabstracts: Added
\@ACM@checkaffil: Changed warning	macro
to error for country 94	\@translatedkeywords: Added
\@beginmaketitlehook:Introduced	macro 46
macro	\@translatedsubtitle: Added
\AtBeginMaketitle: Introduced	macro
macro	\@translatedtitle: Added macro . 46
\maketitle: Added	\ACM@lang@check: Added macro 45
\@beginmaketitlehook 84	\ACM@languages: Introduced macro . 39
v1.76	\maketitle: I13n 84
General: Moved hyperxmp before	translatedabstract: Added macro 46
hyperref, see https:	\translatedkeywords: Added macro 46 \translatedsubtitle: Added macro 46
//github.com/borisveytsman/	\translatedsubtitle: Added macro 46
acmart/issues/425 49	v1.85
\author: Added code for orcid links . 69	General: Added CC licenses 78
\if@ACM@pbalance: Added macro 38	\@acmengagemetadata: Introduced
\maketitle: Put \par inside group	macro
for keywords	\@copyrightowner: Added CC
\orcid: Added code for orcid links 71	licenses
standardpagestyle: Fixed bug with	\@copyrightpermission: Added CC
no line numbers for nonacm 102	licenses
v1.77	\@typesetengagemetadata:
\@mkauthorsaddresses: New	Introduced macro 100
separator of institutions 98	\if@ACM@engage: Introduced macro . 40

\maketitle: acmengage	\acmBadge: Added macro
\setengagemetadata: Introduced macro84	\acmBadgeR: Redefined macro 73 \if@ACM@badge: Deleted macro 73
v1.86	firstpagestyle: Moved badges here 105
\country: Error if country is empty . 92	\set@ACM@acmcpbox: Added logo 87
standardpagestyle: Special	Added zref position of the bottom 87
treatment of ACM Engage	v1.91
materials 102	\acmContributions: Restored the
v1.87	macro
General: Added 'framed' package for	standardpagestyle: Redesigned
acmcp 42	ACMP labels
No numbering sections for ACMCP 109	v1.93
\@ACM@color@frame: Introduced	General: Added PACMSE journal
macro	option
\@ACM@copyright@check@cc: Added	v2.00
macro	General: Deleted acmPrice
\@copyrightpermission: CC licenses	\@ACM@copyright@check@cc: Moved
now are allowed only for non-acm	to warning
or ACM engage publications 80	\@copyrightowner: Changed wording 79
\@mkauthors@i: Special treatment for	\@copyrightpermission: Rewrote
acmcp	wording
\@mktitle@i: Special treatment for	\@folio@ht: Obsoleted macro 105
acmcp	\@folio@max: Obsoleted macro 105
\acmArticleType: Introduced macro 76	\@folio@voffset: Obsoleted macro . 105
\acmCodeDataLink: Added possibility	\@folio@wd: Obsoleted macro 105
to have several links	\@folioblob: Obsoleted macro 105
Introduced macro	\acmPrice: Deleted macro 73
\acmDataLink: Introduced macro	firstpagestyle: Deleted blobs 105
Now this is the same as the code link 77	\maketitle: Added "ACM" for papers 84
\if@ACM@acmcp: Introduced macro 40	Deleted acmPrice 84
firstpagestyle: Special treatment	v2.01
for acmcp	General: Documentation update:
\maketitle: CC license are allowed	POMACS uses acmsmall 36
for non-acm publications 84	\acmBooktitle: Moved default
\set@ACM@acmcpbox: Added macro . 87	conference title to conference
standardpagestyle: Special	setting
treatment of ACMCP 102	\acmPrice: Now the macro produces
v1.88	a warning
\@mktitle@i: Moved down title for	v2.02
acmcp 91	\acmConference: Moved here setting
v1.89	the conference title for bibstrip \dots 68
General: Added 'zref-savepos' package	v2.03
for acmcp 42	General: Added documentation about
\@ACM@acmcp@delta: Added dimen . 42	samples
\@ACM@badge@skip: Redefined macro 73	\acmConference: Made setting
\@ACM@color@frame: Added saving	bibstrip overriding journal 68
the position of the bottom 76	\if@ACM@journal@bibstrip@or@tog:
\@acmBadgeL: Introduced macro 73	Introduced macro 40
\@acmBadgeR: Introduced macro 73	firstpagestyle: Special treatment of
\@mktitle@i: Moved badges to top	tog 105
header 91	\maketitle: Special processing for
Moved up acmcp title 91	conferences in TOG 84
\@mktitle@iii: Moved badges to top	standardpagestyle: Special
header 91	treatment of ACM TOG 102

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
                                                              \@Description@presenttrue
                                      . . . . . . . . . . . . 2593
                                                                      . . . . . . . . . 873, 876
    . . . . . . . . . . . . 616
   . . . 1892, 1895, 1907,
                               \@ACM@instpresenttrue
                                                              \@M . 482, 521, 539, 548, 3478
       1912, 1917, 2017, 2054
                                       . . . 2496, 2507, 2587
                                                              \@abstract 1689, 2794, 2801
                               \@ACM@journal@bibstrip@or@t\@acmarticle 1620, 1623,
\@@authornotemark ..
                                       . . . . . 211, 233, 1452
                                                                      2206, 2819, 2820,
       . . . . . . . 1614, <u>2780</u>
                               \@ACM@journal@bibstripfalse
                                                                      2948, 2951, 2971,
\@@par .... 482, 539
                                                                      2981, 2993, 3066,
\@ACM@acmcp@delta ..
                                       . . . . . . . . 235, 1466
                               \@ACM@journal@bibstriptrue
                                                                      3089, 3099, 3110, 3151
       .... <u>280</u>, 2282, 2286
                                       . . . . . . . . 232, 1451
                                                              \@acmArticlePage ...
\@ACM@acmcpbox ....
                                                                       2947, 2965, 2966,
                               \@ACM@journalfalse .
       2269, 2273, 3062, 3147
                                       ..... 213,
                                                                      2975, 2978, 2985, 2989
\@ACM@acmcpfalse ... 170
                                       215, 217, 219, 221, 224
                                                              \@acmArticleSeq . . . 1622
\@ACM@acmcptrue .... 228
                               \@ACM@journaltrue ..
                                                              \@acmBadgeL .....
\@ACM@addtoaddress .
                                       204, 206, 208, 210, 227
                                                                       1646, 1661, 1662,
        2484, 2512, 2513, 2515
                               \@ACM@labelwidth 1007,
                                                                      1667, 3080, 3092,
\@ACM@authorsperrow
                                       1010, 1018, 1023, 1049
                                                                      3093, 3104, 3105,
       . . . . . . . . <u>1718</u>,
                               \@ACM@maketitle@typesetfalse
                                                                      3117, 3120, 3125, 3146
       2659, 2660, 2712, 2713
                                       . . . . . . . . . . . . 1056
                                                              \@acmBadgeR .....
\@ACM@badge@skip ...
                               \@ACM@maketitle@typesettrue
                                                                       1645, 1648, 1649,
       ... <u>1643</u>, 1655, 1668
                                       . . . . . . . . . . . . 2118
                                                                      1654, 3081, 3094,
\@ACM@badge@width ..
                                                                      3095, 3102, 3103,
                               \@ACM@manuscriptfalse 199
       ..... \underline{1640},
                                                                      3118, 3121, 3126, 3147
                               \@ACM@manuscripttrue 197
       1652, 1658, 1665, 1671
                               \@ACM@newfontsfalse
                                                              \@acmBooktitle . 1467,
\@ACM@balancefalse .
                                       . . . . . . 837, 840, 843
                                                                      1477, 2175, 2196, 2835
       .... 3380, 3404,
                               \@ACM@newfontstrue . 834
                                                              \@acmCodeDataLink ..
       3406, 3408, 3420, 3424
                                                                      . . . . 1782, 1783,
                               \@ACM@printacmreffalse
\@ACM@checkaffil 2240,
                                                                      1785, 1787, 2289, 2290
                                       . . . . . . . . . . 95, 229
       <u>2597</u>, 2628, 2633,
                               \@ACM@printfoliostrue 78
                                                              \@acmContributions .
       2695, 2700, 2740, 2745
                               \@ACM@resetaffil ...
                                                                      . . . 1788, 2295, 2296
\@ACM@citypresentfalse
                                                              \@acmDOI . . 1638, 2198,
                                        2592, 2627, 2632,
       . . . . . . . . . . . . . 2594
                                       2694, 2699, 2739, 2744
                                                                      2201, 2207, 2210,
\@ACM@citypresenttrue
                               \@ACM@reviewtrue ... 140
                                                                      2843, 3010, 3012,
       . . . 2498, 2512, 2589
                                                                      3034, 3036, 3067, 3152
                               \@ACM@screentrue ...
\@ACM@color@frame ..
                                       . . . . 1175, 1219,
                                                              \@acmEditors 1480.1481.
       ..... <u>1775,</u> 2266
                                       1225, 1239, 1245, 1251
                                                                      1482, 1485, 2836, 2837
\@ACM@commabox ....
                               \@ACM@sigchiamodefalse
                                                              \@acmISBN . . . . 1636, 2209
       . . . 2484, 2488, 2489
                                                              \@acmMonth 1626, 1628, 2206
                                       . . . . . . . . . . . . . . 201
\@ACM@copyright@check@cc
                               \@ACM@sigchiamodetrue 222
                                                              \@acmNumber .....
       . . . . . . . . 1928, 2072
                                                                       1618, 2832, 2971,
                               \@ACM@timestamptrue
\@ACM@countrypresentfalse
                               \@ACM@title@width ..
                                                                      2981, 2993, 3065,
       ..... 2595
                                                                      3089, 3099, 3110, 3150
                                       . . . . . . . . 1642,
\@ACM@countrypresenttrue
                                       2457, 2459, 2468, 2469
                                                              \@acmPubDate .....
       . . . 2503, 2515, 2591
                               \@DeclareACMFormat 38,
                                                                       <u>1628</u>, 2832, 2971,
\@ACM@engagefalse .. 168
                                                                      2981, 2994, 3067,
                                      39, 40, 41, 42, 43,
\@ACM@engagetrue ... 225
                                       44, 45, 46, 47, 48, 49
                                                                      3090, 3100, 3111, 3152
\@ACM@institution@separator\@Description@presentfalse \@acmSubmissionID ...
       . . . 2762, 2763, 2768
                                       . . 879, 882, 957, 2786
                                                                      . . . . . . . . . 1506,
```

1507, 1526, 1527,	2613, 2678, 2725, 2769	\@currentaffiliation
1634, 2928, 2929, 2939	\@authorfont <u>2545</u> , 2550,	2652, 2655, 2677,
\@acmVolume	2554, 2557, 2560,	2684, 2685, 2688,
1616, 2832, 2970,	2563, 2566, 2569,	2691, 2692, 2697,
2980, 2993, 3065,	2572, 2575, 2615, 2651	2724, 2731, 2732,
3088, 3098, 3110, 3150	\@authornotemark	2734, 2736, 2737, 2742
\@acmYear 1624, 1631,	1606, 1612, <u>2779</u>	\@currentaffiliations
2091, 2175, 2206, 2823	\@authornotes	2581,
\@acmdefinitionbodyfont	<u>1603</u> , 1607, 2138	2582, 2583, 2585,
3291, 3303, 3317	\@authorsaddresses .	2611, 2623, 2624, 2630
\@acmdefinitionheadfont	1578,	\@currentauthors
3293, 3305, 3319	2147, 2298, 2774, 2853	2579, 2580,
\@acmdefinitionindent	\@auxout 652, 2285	2610, 2614, 2615,
<u>3292</u> , 3304, 3318	\@begindocumenthook 648	2617, 2651, 2654,
\@acmdefinitionnotefont	\@beginmaketitlehook	2676, 2678, 2679,
<u>3294</u> , 3306, 3322	<u>2108</u> , 2111, 2117	2681, 2723, 2725,
\@acmengagemetadata	\@botnum 2259	2726, 2728, 2779, 2780
<u>2112</u> , 2114, 2856	\@citestyle 314	\@currentlabel . 566,580
\@acmownedfalse	\@classname 24,	\@dblarg 468
1843, 1846,	26, 35, 53, 55, 56,	\@dblfloat <u>969</u>
1849, 1854, 1857,	61, 63, 64, 69, 71,	\@department 1556, 1557
1860, 1863, 1866,	72, 77, 80, 81, 86,	\@dotsep <u>3258</u>
1872, 1875, 1878, 1881	88, 89, 94, 100,	\@editorsAbbrev
\@acmownedtrue	101, 105, 109,	<u>1479</u> , 1484, 2837
1830, 1839, 1869	114, 116, 117, 122,	\@empty 155,
$\ensuremath{\texttt{Qacmplainbodyfont}}$.	124, 125, 130, 132,	237, 384, 424, 472,
<u>3259</u> , 3271, 3285	133, 138, 142, 143,	1463, 1467, 1481,
$\ensuremath{\texttt{Qacmplainheadfont}}$.	161, 172, 178, 184,	1503, 1506, 1524,
$\dots \underline{3261}, 3273, 3287$	263, 425, 449, 835,	1526, 1531, 1532,
\@acmplainindent	838, 841, 878, 887,	1538, 1648, 1661,
3260, 3272, 3286	890, 960, 1176,	1679, 1680, 1736,
\@acmplainnotefont .	1220, 1226, 1240,	1737, 1743, 1750,
3262, 3274, 3290	1246, 1252, 1446,	1782, 1793, 1819,
\@adddotafter	1448, 1496, 1551,	2109, 2142, 2147,
3166, 3167, 3169,	1565, 1632, 1676,	2198, 2209, 2210,
3181, 3196, 3200, <u>3253</u>	1682, 1687, 1694,	2221, 2224, 2230,
\@additionalaffiliation	1696, 1697, 1700,	2234, 2289, 2292,
1552, 1553	1702, 1703, 1706,	2295, 2298, 2333,
\@addpunct . 2766, 2852,	1714, 1716, 1717,	2462, 2471, 2480,
2853, 3253, 3254, 3374	1719, 1720, 1768,	2502, 2581, 2614,
\@addspaceafter 3254	1821, 1930, 1934,	2622, 2623, 2678,
\@affiliationfont	1937, 2599, 2602,	2684, 2691, 2725,
<u>2546</u> , 2551,	2605, 2775, 2789,	2731, 2736, 2774,
2555, 2558, 2561,	2816, 3482, 3485, 3492	2782, 2819, 2824,
2564, 2567, 2570,	\@clubpenalty 527	2836, 2843, 2928,
2573, 2576, 2628, 2651	\@concepts . 1793, 1805,	2939, 3010, 3012,
\@afterheading . 513, 2262	1819, 2224, 2226, 2244	3034, 3036, 3066,
\@afterindentfalse .	\@copyrightowner	3067, 3151, 3152,
	1889, 2182	3262, 3294, 3443, 3460
\@afterindenttrue 457	\@copyrightpermission	\@endfloatbox 972
\@article@string	1944, 2158, 2170	\@endpefalse 3376
2819, 2832, 2840	\@copyrightyear	\@endwidefloatbox 972, 980
\@author	2090, 2182, 2184	\\(\text{0finalstrut} \cdot \\(\text{571}, \frac{584}{584}\)
1505, 1511, 1518,	\@currbox 986, 987, 988	\@float 974
1303, 1311, 1310,	(CCUI I DON 700, 707, 700	(6) 1000

```
1154, 1158, 1163,
                                                                    2232, 2245, 2292, 2293
\@flushglue ..... 3210
                                     1167, 1171, 1178,
\@fnsymbol .... 2128
                                                             \@latex@error .... 358
                                     1182, 1186, 1190,
\@folio@ht ..... 3072
                                                             \@lempty .... <u>1691</u>, 2794
                                                             \@listI ..... 1031, 1035
                                     1195, 1199, 1203,
\@folio@max ..... <u>3072</u>
\@listi ..... 1028, 1035
                                     1207, 1212, 1216,
                                     1222, 1228, 1232,
                                                             \@listii ..... 1036
\@folio@wd ..... <u>3072</u>
                                     1236, 1242, 1248,
                                                             \@listiii ..... 1039
\@folioblob .... 3072
                                     1254, 1258, 1262,
\@footnotemark . 587, 2126
                                                             \@listiv ..... <u>1041</u>
                                     1267, 1271, 1275,
\@footnotemark@nolink
                                                             \@listv ..... 1043
                                     1279, 1283, 1287,
       . . . . . . . . 587, 2126
                                                             \@listvi ..... <u>1045</u>
                                     1291, 1295, 1299,
\@footnotetext ....
                                                             \@m .... 470
                                     1303, 1307, 1311,
       . . . . . 562, 588, 2127
                                                             \@makefnmark ... 561,
\ensuremath{\texttt{Q}} footnotetext\ensuremath{\texttt{Q}} nolink
                                     1315, 1319, 1323,
                                                                    <u>586</u>, 2130, 2135, 2139
                                     1327, 1331, 1335,
       . . . . . . . . 588, 2127
                                                             \@makefntext .....
                                     1339, 1343, 1347,
\@for ..... 290
                                                                    . . <u>561</u>, 570, 583, 2141
                                     1351, 1355, 1359,
\@formatdoi .... 1927,
                                                             \ensuremath{\mbox{\sc Marginfigure}} . 952, 953
                                     1363, 1367, 1372,
       2201, 2207, 2210,
                                                             \@margintable .. 963, 964
                                     1377, 1381, 1385,
       2843, 3010, 3012,
                                                             \@minipagefalse . 795,982
                                     1390, 1394, 1398,
       3034, 3036, 3067, 3152
                                                             \@minus 3186, 3190, 3194,
                                     1402, 1406, 1410,
\@fps .... 973
                                                                    3198, 3202, 3207,
                                     1414, 1418, 1422,
\@fpsadddefault .... 973
                                                                    3282, 3284, 3314, 3316
                                     1426, 1430, 1434,
                                                             \@mkabstract .. 2220, 2793
\@gobble ..... 312, 356
                                     1438, 1442, 1454,
                                                             \@mkauthors 2131, 2133, <u>2517</u>
\@hangfrom .... 481, 538
                                     1455,\,2194,\,3065,\,3150
                                                             \@mkauthors@i .....
\@headfootfont ....
                              \@journalNameShort .
       .... <u>2941</u>, 2965,
                                                                    .... 2521, 2523,
       2966, 2967, 2968,
                                      . . . . 1135, 1139,
                                                                    2525, 2527, 2541, 2609
       2974, 2977, 2984,
                                     1143, 1147, 1151,
                                                             ∖@mkauthors@ii .... <u>2644</u>
       2988, 3002, 3003,
                                     1155, 1159, 1164,
                                                             \@mkauthors@iii ....
       3009, 3011, 3015,
                                     1168, 1173, 1179,
                                                                    . . . . 2529, 2531,
       3018, 3026, 3027,
                                     1183, 1187, 1191,
                                                                    2533, 2535, 2539, <u>2656</u>
                                     1196, 1200, 1204,
                                                             \@mkauthors@iv 2537, 2709
       3033, 3035, 3039, 3042
\@idxitem .... 3475
                                     1208, 1213, 1217,
                                                             \@mkauthorsaddresses
                                     1223, 1229, 1233,
\@ifnextchar ..... <u>1556</u>
                                                                    . . . . . . . . 1579, <u>2753</u>
                                     1237, 1243, 1249,
\@ifnotempty .... 2096
                                                             \@mkbibcitation 2255, 2810
                                     1255, 1259, 1263,
\@ifnum ..... 328, 330
                                                             \@mkteasers ... 2131, 2781
\@ifstar ..... 466
                                     1268, 1272, 1276,
                                                             \@mktitle . . . . . 2131, <u>2377</u>
\@ifundefined .....
                                     1280, 1284, 1288,
                                                             \@mktitle@i 2380, 2382,
                                     1292, 1296, 1300,
        3327, 3330, 3333,
                                                                    2384, 2386, 2400, 2453
                                     1304, 1308, 1312,
       3336, 3339, 3343, 3346
                                                             \@mktitle@ii ..... 2466
                                     1316, 1320, 1324,
\@iiiparbox ..... 798
                                                             \@mktitle@iii .....
                                     1328, 1332, 1336,
\@indextitlestyle .. 3474
                                                                    .... 2388, 2390,
                                     1340, 1344, 1348,
                                                                    2392, 2394, 2398, 2466
\@input ..... 550
                                     1352, 1356, 1360,
\@insideauthorgroupfalse
                                                             \@mktitle@iv .. 2396, 2476
                                     1364, 1368, 1373,
       . . . . . . . . 1494, 1546
                                                             \@mktranslatedabstract
                                     1378, 1382, 1386,
\@insideauthorgrouptrue
                                                                    . . . . . . . . . 447, 2803
                                     1391, 1395, 1399,
       . . . . . . . . . . . . 1501
                                                             \@mktranslatedkeywords
                                     1403, 1407, 1411,
\@journalCode .. 1057,
                                                                    . . . . . . . . . 444, 1580
                                     1415, 1419, 1423,
       1176, 1220, 1226,
                                                             \@mpargs ..... 798
                                     1427, 1431, 1435,
       1240, 1246, 1252, 1446
                                                             \@mparswitchfalse .. 744
                                     1439, 1443, 1455,
\@journalCode@nr ...
                                                             \@mpfootins .....
                                     2831, 2970, 2980,
       . . . 1057, 1132, 1453
                                                                    575, 576, 790, 791, 793
                                     2992, 3088, 3098, 3109
\@journalName ....
                                                             \@mpfootnotetext ... 574
       . . . . 1134, 1138,
                              \@keywords . . . . 1678,
                                                             \@ne . 316, 320, 324, 326,
       1142, 1146, 1150,
                                     1679, 1680, 2230,
                                                                    638, 2870, 2876, 2880
```

\@nil 335	\@printpermissiontrue	\@teaserfigures
\@nobreakfalse . 515, 555	1828, 1837, 1852	2092, 2094, 2782, 2787
•	\@printtopmatter	\@tempa 290,
\@noskipsecfalse 519		291, 293, 295, 297,
\@noskipsectrue 516	\@proofindent	299, 301, 303, 305,
\@pages@word	•	
2813, 2833, 2840	<u>3353</u> , 3363, 3373	307, 309, 311, 313,
\@par 2144, 2151	\@proofnamefont	315, 317, 319, 321,
\@parboxrestore 579	3352, 3362, 3374	323, 325, 327, 329,
\@parfont	\@received . <u>1734</u> , 1737,	331, 333, 335, 338,
3200, 3204, 3209, 3214	1738, 1740, 1743,	340, 342, 344, 346,
\@permissionCodeOne	1744, 1746, 1750, 1751	348, 1530, 1531,
1136, 1140,	\@restonecolfalse 3472	1735, 1736, 2501,
1144, 1148, 1152,	\@restonecoltrue 3472	2502, 2622, 3443,
	\@rightskip 3210, 3211	3459, 3460, 3462, 3466
1156, 1160, 1165,	\@saveabstract 1685, <u>1686</u>	\@tempb
1169, 1174, 1180,	\@saveteaser 2093, <u>2094</u>	291, 293, 295, 297,
1184, 1188, 1192,	\@savetranslatedabstract	299, 301, 303, 305,
1197, 1201, 1205,	447, <u>448</u>	307, 309, 311, 313,
1209, 1214, 1218,	\@seccntformat . 475,532	315, 317, 319, 321,
1224, 1230, 1234,	\@secfont 3188, <u>3214</u>	323, 325, 327, 329,
1238, 1244, 1250,	\@secpenalty 464	331, 333, 338, 340,
1256, 1260, 1264,	\@sect 468, 469	342, 344, 346, 348,
1269, 1273, 1277,	\@setaddresses 2778	3461, 3462, 3465, 3466
1281, 1285, 1289,	\@setauthorsaddresses	\@tempboxa . 798, 2342, 2344
1293, 1297, 1301,	2151, 2298, 2853	\@tempc . 336, 337, 339,
1305, 1309, 1313,	\@setengagemetadata	341, 343, 345, 347, 349
1317, 1321, 1325,	2115, 2855	\@tempdima
1329, 1333, 1337,	\@setthanks 2144, 2852	2280, 2283, 2284,
1341, 1345, 1349,	\@shortauthors	2286, 2338, 2339,
1353, 1357, 1361,	2936, 2959, 2967,	2340, 2346, 2347, 2348
1365, 1369, 1374,	2975, 2985, 3003, 3027	\@tempskipa
1379, 1383, 1387,	\@sidebar 948, 949	456, 458, 459, 464,
1392, 1396, 1400,	\@specialsection	477, 478, 509, 510,
1404, 1408, 1412,	1582, 2225, 2231, 2302	512, 524, 525, 534, 535
1416, 1420, 1424,	\@ssect 467, 533	\@textbottom 799
1428, 1432, 1436,	\@startPage 1674,	\@textsuperscript
1440, 1444, 1456, 2206	2333, 2334, 2336, 2933	586, 2130, 2135
\@permissionCodeTwo	\@startsection . 453,	\@texttop 800
1161,	545, 3185, 3189,	\@thefnmark . 567, 581,
1193, 1210, 1265,	3193, 3197, 3201, 3206	586, 2130, 2135, 2140
1370, 1375, 1388, 1457	\@starttoc 545	\@title 1586, 2243,
\@plus 548, 556,		2461, 2470, 2479, 2823
799, 3186, 3190,	\@subparfont 3239	\@titlefont 2403, 2458,
3194, 3198, 3202,	\@subsecfont 3192, <u>3214</u>	2460, 2467, 2469, 2477
3207, 3281, 3283,	\@subsubsecfont 3196, <u>3214</u>	\@titlenotes
3313, 3315, 3371, 3476	\@subtitle . 1487, 1595,	
\@printcopyrightfalse	2462, 2463, 2471,	<u>1584</u> , 1588, 1591, 2136
1842, 1853	2472, 2480, 2481, 2824	\@tochangmeasure 486, 499
	\@subtitlefont	\@toclevel 470
\@printcopyrighttrue	<u>2428</u> , 2463, 2472, 2481	\@tocline 558, 559, 560
1826, 1838	\@subtitlenotes	\@topnum 2257
\@printendtopmatter	<u>1593</u> , 1597, 1600, 2137	\@translatedabstracts
2260, <u>2845</u>	\@svsec . 472, 475, 481, 496	. <u>445</u> , 452, 2221, 2222
\@printpermissionfalse	\@svsechd 494, 522, 542	\@translatedkeywords
1841	\@teaser 2094, 2783	. 442, 444, 2234, 2235

\@translatedsubtitle	2209, 2290, 2815,	\ACM@lang@check
439,	2823, 2875, 3067, 3152	423, 437, 440, 443, 451
441, 2463, 2472, 2481	\{ 298	\ACM@languages
\@translatedtitle 436,	\} 298	153, 384, 386, 424
438, 2461, 2470, 2479	\ 1470, 1801,	\ACM@linecount
\@typeset@author@bx	1811, 2182, 2184,	2869, 2870,
2648,	2819, 2820, 2838, 2933	2875, 2876, 2879, 2880
2702, 2708, 2747, 2752	2017, 2020, 2030, 2733	\ACM@linecount@bx
\@typeset@author@line	Α	2866, 2886, 2916
2578, 2612, 2636, 2641	\abstract <u>1685</u>	\ACM@linecount@bxht
\@typesetengagemetadata	abstract (env.)	2868, 2874, 2877, 2878
2218, <u>2854</u>	\abstractname 382,	\ACM@linecountL
\@undefined 648, 866, 2108	395, 2795, 2799, 2807	2882, 2957,
\@undescribed@imagesfalse	\acks 3434	2960, 2965, 2968,
	acks (env.)	2974, 2976, 2984,
\@undescribed@imagestrue		2986, 3002, 3005,
•	\acksname 393, 404, 412,	3009, 3015, 3026,
886, 889, 959, 2788	420, <u>3433</u> , 3436, 3437	3029, 3033, 3039,
\@vspace 880, 883, 891,	\ACM@adddotafter	3061, 3080, 3092,
893, 895, 897, 899,		3093, 3104, 3105,
901, 903, 905, 907,	\ACM@ArticleType	
909, 949, 954, 964,	1753, 3060, 3145	3117, 3120, 3125, 3146
970, 2124, 2303,	\ACM@ArticleType@nr	\ACM@linecountR . 2889,
2329, 2811, 2846,	1753, 1755, 3058, 3143	2987, 2989, 3003,
2849, 3480, 3482, 3488	\ACM@cc@type 1887,	3006, 3013, 3020,
\@vspace@acm	2073, 2075, 2076,	3027, 3030, 3037,
2329, 2849, 3488	2079, 2080, 2081,	3044, 3118, 3121, 3126
\@vspace@orig 880, 883,	2082, 2083, 2084, 2085	\ACM@mk@linecount
891, 893, 895, 897,	\ACM@CC@Url	2871, 2884,
899, 901, 903, 905,	2074, 2075, 2076, 2077	2899, 2901, 2903,
907, 909, 949, 954,	\ACM@cc@version	2905, 2907, 2909, 2911
964, 970, 2124,	1886, 2075, 2086	\ACM@NR@adjustedSectionformat
2303, 2811, 2846, 3480	\acm@copyrightinput 1832	3164, <u>3173</u>
\@vspacer <u>881, 884, 892,</u>	\acm@copyrightmode .	\ACM@NRadjust
894, 896, 898, 900,	1832,	<u>3155</u> , 3188, 3192,
902, 904, 906, 908,	1840, 1845, 1848,	3196, 3200, 3204, 3209
910, 950, 955, 965,	1851, 1856, 1859,	\ACM@origbaselinestretch
971, 2125, 2304,	1862, 1865, 1868,	<u>3490</u>
2330, 2812, 2847,	1871, 1874, 1877,	\ACM@ps@headings
2850, 3481, 3485, 3489	1880, 1890, 1945, 2157	2860, 2864
\@vspacer@acm	\ACM@fontsize $\underline{146}$, $\underline{237}$,	\ACM@ps@myheadings .
2330, 2850, 3489	240, 242, 244, 246,	2859, 2863
\@vspacer@orig . 881,	248, 250, 252, 254,	\ACM@ps@plain . 2858, 2862
884, 892, 894, 896,	256, 258, 260, 263, 264	\ACM@restore@pagestyle
898, 900, 902,	\ACM@format 32, 161	
904, 906, 908,	\ACM@format@nr 32,	\ACM@sect@format
910, 950, 955,	161, 171, 177, 183,	3174, 3176
965, 971, 2125,	196, 202, 238, 599,	\ACM@sect@format@
2304, 2812, 2847, 3481	684, 763, 801,	3163, 3176, 3178
\@width 779,786	921, 990, 2305,	\ACM@sect@format@null
\@xp 552, 553	2352, 2378, 2404,	3177, 3178
\@xsect 507, 508, 544	2429, 2519, 2547,	\ACM@timestamp
\\ 669, 678, 1506,	2891, 2955, 3078,	<u>2919</u> , 3052, 3131, 3136
1785, 2076, 2182,	3130, 3219, 3263,	\acmArticle 14, 1620
2187, 2202, 2206,	3295, 3354, 3381, 3402	\acmArticleSeq . 15 , 1622

\acmArticleType . 20, 1753	1498, 1500, 1778,	В
\acmBadge <u>15</u> , <u>1673</u>	2339, 2347, 2455,	\balance 3431
\acmBadgeL <u>1660</u>	2638, 2658, 2675,	\baselineskip 2168,
\acmBadgeR 1647, 1673	2711, 2722, 2876, 2880	2877, 3186, 3187,
\acmBooktitle 9, 1468, 1477	\affiliation 10,	3190, 3191, 3194,
\acmCodeDataLink 1781	1545, 2621, 2691, 2736	3198, 3202, 3281,
\acmCodeLink 20 , 1781 , $\overline{1790}$	\and 1485, 1518,	3282, 3283, 3284,
\acmConference 9, 1458	1520, 1535, 1541,	3313, 3314, 3315, 3316
\acmConference@date	2612, 2617, 2619,	\baselinestretch
1461,	2630, 2636, 2649,	3490, 3491, 3493
2177, 2997, 3017,	2683, 2702, 2708,	\begin 19, 2885, 2915
3020, 3041, 3044, 3114	2730, 2747, 2752, 2768	\begingroup 479,
\acmConference@name	\andify 2250,	522, 536, 545, 637,
1460, 1468, 1469	2251, 2579, 2582, 2837	2123, 2517, 3156, 3435
\acmConference@shortname	\anon 24, 2102	\bfseries 1047, 2164,
1459, 1463,	anonsuppress (env.) 24	2406, 2408, 2410,
1464, 1469, 1470,		2414, 2416, 2418,
2177, 2996, 3016,	\apptocmd 3482, 3485	2420, 2422, 2424,
3019, 3040, 3043, 3113	\AtBeginDocument	2426, 2566, 2569,
\acmConference@venue	78, 95, 229,	2821, 3214, 3215,
1462,	641, 649, 1008,	3229, 3230, 3232,
2177, 2997, 3017,	2865, 2942, 3072, 3179	3233, 3235, 3236,
3020, 3041, 3044, 3114	\AtBeginEnvironment	3237, 3238, 3242,
\acmContributions <u>1788</u>	879, 882, 891, 893, 895, 897, 899,	3243, 3246, 3247,
\acmDataLink 20, <u>1790</u>	901, 903, 905, 907, 909	3249, 3250, 3273, 3305
\acmdefinition $\dots \frac{3312}{1600}$, , , , ,	\bgroup . 452, 949, 953,
\acmDOI 15, <u>1638</u>	\AtBeginMaketitle 32, 2111	964, 970, 1553,
\acmISBN	\AtEndDocument	1580, 2224, 2230,
\acmJournal 9, $\underline{1450}$ \acmMonth 14 , $\underline{1626}$	877, 1680,	2271, 2648, 2685, 2688, 2749, 2758,
\acmNumber 14, 1618	1704, 1749, 1819, 2265, 2773, 3428, 3491	2783, 2793, 2810, 2822
\acmplain		\bibfont 288
\acmPrice 1632	\AtEndEnvironment 885, 888	\bibliofont 288
\acmSubmissionID	\AtEndPreamble . 614,	\bibliographystyle . 647
\acmVolume 14, 1616	867, 3324, 3378, 3444	\bibsection 284
\acmYear 14, 1624	\author 10,	\bibstyle 312, 314, 356, 652
\addcontentsline 286,	<u>1495</u> , 2120, 2121, 2817	\bibstyle@acmauthoryear
488, 501, 2795, 3437	\author@bx <u>2644</u> , 2650, 2653	
\additionalaffiliation	\author@bx@sep	\bibstyle@acmnumeric 368
	<u>2646,</u> 2653,	\bigskip 1751,
\addpenalty 464	2658, 2675, 2711, 2722	2289, 2290, 2292,
\addresses	\author@bx@wd	2295, 2298, 2370,
1503, 1505, 1510,	<u>2645</u> , 2648,	2465, 2475, 2483,
1517, 1548, 1568,	2657, 2658, 2660, 2666, 2668, 2670,	2708, 2752, 2783, 2848
1606, 1612, 1614,	2672, 2675, 2710,	\box 987, 2354,
2641, 2708, 2752, 2771	2711, 2713, 2719, 2722	2356, 2358, 2360,
\addto 387, 398, 406, 414	\authornote	2362, 2364, 2366,
\addtocounter 592, 1813	. 14, 1552, 1604, 2818	2368, 2370, 2372,
\addtolength 1016, 1017,	\authornotemark . 14, 1610	2374, 2653, 3062, 3147
1018, 1022, 1023, 2877	\authors	C
\addvspace 464, 556 \advance	1508, 1513, 1520,	C \c@footnote 2128
1032, 1037, 1040,	2238, 2250, 2252, 2823	\c@secnumdepth
1042, 1044, 1046,	\authorsaddresses 14, 1578	471, 485, 489, 498, 502
1012, 1011, 1010,	, autilior Jadar CJJCJ 17, <u>15/0</u>	1, 1, 103, 107, 170, 302

```
311, 313, 315, 316,
\captionsenglish ... 387
                              \CodelineIndex .... 16
                                                                   317, 318, 319, 320,
\captionsetup .. 913,
       915, 917, 919, 928,
                              \Collect@Body 446,948,
                                                                   321, 322, 323, 324,
       930, 933, 935, 938,
                                     952, 963, 1685, 2093
                                                                   325, 327, 329, 331,
                              \color .... 2104, 2166,
       940, 950, 956, 965, 2784
                                                                   333, 334, 338, 340,
                                                                   342, 344, 346, 348,
\captionsfrench . . . . 398
                                     2875, 2879, 3059, 3144
                                                                   436, 439, 442, 445,
\captionsgerman . . . .
                              \color@begingroup 569, 582
                                                                   448, 453, 469, 494,
\captionsspanish ... 414
                              \color@endbox .... 985
\ccdesc@parse@finish 1824
                                                                   508, 532, 533, 542,
                              \color@endgroup . . . .
                                     . . . . . . 572, 585, 796
                                                                   545, 558, 559, 560,
\ccsdesc . . . . . . 16, 1795
                                                                   561, 563, 574, 586,
\ccsdesc@parse 1796, 1797
                              \colorbox . 1777, 3059, 3144
                                                                   592, 593, 594, 595,
\ccsdesc@parse@end .
                              \colorlet .... 1757,
                                                                   596, 616, 647, 778,
       . . . . . . . 1796, 1824
                                     1759, 1761, 1763, 1765
                                                                   785, 787, 799, 949,
\ccsdesc@parse@finish
                              \columnsep .... 3473
                                                                   953, 964, 970, 973,
       . . . . . . . . 1818, 1824
                              \columnseprule .... 3473
                                                                   977, 980, 998, 999,
CCSXML (env.) . . . . . . . . . 16
                              \columnwidth ... 578,
                                                                   1000, 1001, 1031,
\centering .. 549, 582,
                                     779, 971, 2710, 2749
                                                                   1036, 1039, 1041,
       668, 677, 957, 966,
                              \contentsnamefont .. 549
                                                                   1043, 1045, 1134,
       2467, 2469, 2650, 2707
                              \copy ..... 2489
                                                                   1135, 1136, 1138,
\changes ..... 146
                              \copyright .... 2182
                                                                   1139, 1140, 1142,
\cite ... 630, 631, 642, 646
                              \copyrightpermissionfootnoterule
                                                                   1143, 1144, 1146,
\citeA ..... 636
                                     1147, 1148, 1150,
\citealt .....
                        635
                              \copyrightyear . 18, 2090
                                                                   1151, 1152, 1154,
\citeANP .....
                        632
                              \country 12, 1562, 2492, 2767
                                                                   1155, 1156, 1158,
\citeauthor .....
                        632
                              \csname .... 356, 484,
                                                                   1159, 1160, 1161,
\citeN ......
                                     486, 490, 497, 499,
                                                                   1163, 1164, 1165,
                                     503, 532, 552, 553,
\citename .....
                                                                   1167, 1168, 1169,
\citeNN .....
                                     567, 581, 1512,
                                                                   1171, 1173, 1174,
\citeNP .....
                                     1519, 1572, 1575,
                                                                   1178, 1179, 1180,
\citep ..... 631
                                     1800, 1801, 1803,
                                                                   1182, 1183, 1184,
\citestyle ... 26, 354, 374
                                     1804, 1805, 1806,
                                                                   1186, 1187, 1188,
                                     1807, 1810, 1812,
\citeyear .... 634
                                                                   1190, 1191, 1192,
\citeyearNP ..... 634
                                     2247, 2249, 3157, 3180
                                                                   1193, 1195, 1196,
\citeyearpar ... 633, 646
                              \CurrentOption ....
                                                                   1197, 1199, 1200,
\city . . 12, 1559, 2492, 2764
                                      . . . . . . 148, 149,
                                                                   1201, 1203, 1204,
                                     150, 151, 152, 158, 159
\ClassError 35, 425, 449,
                                                                   1205, 1207, 1208,
       1448, 1551, 1687,
                                                                   1209, 1210, 1212,
       1697, 1703, 1717,
                                           D
                                                                   1213, 1214, 1216,
       1768, 2605, 2816, 3492
                              \day . . . . . . . . . . . . 2931
                                                                   1217, 1218, 1222,
\ClassInfo . . 161, 263,
                              \DeclareNewFootnote
                                                                   1223, 1224, 1228,
                                     . . . . . . . . . . 782, 784
       1446, 1694, 1696,
                                                                   1229, 1230, 1232,
       1700, 1702, 1714,
                              \DeclareOptionX . . . .
                                                                   1233, 1234, 1236,
       1716, 1719, 1930, 1934
                                      38, 148, 149, 150,
                                                                   1237, 1238, 1242,
\ClassWarning ... 26,
                                     151, 152, 154, 158, 159
                                                                   1243, 1244, 1248,
       172, 178, 184, 835,
                              \DeclareRobustCommand
                                                                   1249, 1250, 1254,
       838, 841, 887, 890,
                                     . . . . . . . . 636, 3176
                                                                   1255, 1256, 1258,
       960, 1496, 1565,
                              \DeclareTextFontCommand
                                                                   1259, 1260, 1262,
       1632, 1676, 1720,
                                     . . . . . . . . . . . . . . 868
                                                                   1263, 1264, 1265,
       1937, 2789, 3482, 3485
                              \def 24, 38, 147, 153, 240,
                                                                   1267, 1268, 1269,
\ClassWarningNoLine
                                     242, 244, 246, 248,
                                                                   1271, 1272, 1273,
       . 878, 1682, 1706.
                                     250, 252, 254, 256,
                                                                   1275, 1276, 1277,
       1821, 2599, 2602, 2775
                                     258, 260, 291, 293,
                                                                   1279, 1280, 1281,
\cleaders . . . . . . . . 2489
                                     295, 297, 299, 301,
                                                                   1283, 1284, 1285,
\clearpage .... 2345
                                     303, 305, 307, 309,
```

```
1287, 1288, 1289,
                               1686, 1691, 1722,
                                                               3243, 3246, 3247,
1291, 1292, 1293,
                               1734, 1735, 1770,
                                                               3249, 3250, 3253,
1295, 1296, 1297,
                               1776, 1781, 1787,
                                                               3254, 3259, 3260,
1299, 1300, 1301,
                               1788, 1797, 1798,
                                                               3261, 3262, 3271,
1303, 1304, 1305,
                               1824, 1883, 1886,
                                                               3272, 3273, 3274,
1307, 1308, 1309,
                               1887, 1889, 1927,
                                                               3291, 3292, 3293,
1311, 1312, 1313,
                               1928, 1944, 2074,
                                                               3294, 3303, 3304,
1315, 1316, 1317,
                               2090, 2092, 2094,
                                                               3305, 3306, 3352,
1319, 1320, 1321,
                               2111, 2112, 2113,
                                                               3353, 3362, 3363,
1323, 1324, 1325,
                               2117, 2130, 2135,
                                                               3441, 3443, 3459,
1327, 1328, 1329,
                                                               3460, 3461, 3465, 3472
                               2144, 2151, 2240,
                                                       \define@boolkey ....
1331, 1332, 1333,
                               2270, 2302, 2332,
                                                               . . . 51, 59, 67, 75,
1335, 1336, 1337,
                               2377, 2403, 2428,
1339, 1340, 1341,
                               2453, 2466, 2476,
                                                               84, 92, 104, 108,
1343, 1344, 1345,
                               2485, 2492, 2493,
                                                               112, 120, 128, 136,
1347, 1348, 1349,
                               2495, 2496, 2498,
                                                               1550, 1692, 1698, 1712
                               2499, 2501, 2506,
1351, 1352, 1353,
                                                       \define@choicekey ..
1355, 1356, 1357,
                               2507, 2511, 2512,
                                                               . 32, 1057, 1753, 1831
1359, 1360, 1361,
                               2514, 2515, 2517,
                                                       \define@cmdkey .... 1718
1363, 1364, 1365,
                               2545, 2546, 2550,
                                                       \definecolor .....
1367, 1368, 1369,
                               2551, 2554, 2555,
                                                               . . . 656, 657, 658,
1370, 1372, 1373,
                               2557, 2558, 2560,
                                                               659, 660, 661, 662, 663
                               2561, 2563, 2564,
1374, 1375, 1377,
                                                       \department .....
1378, 1379, 1381,
                               2566, 2567, 2569,
                                                               . 12, 1556, <u>2492</u>, 2766
1382, 1383, 1385,
                               2570, 2572, 2573,
                                                       \Description .... 23, <u>876</u>
1386, 1387, 1388,
                               2575, 2576, 2578,
                                                       \description .... 1048
1390, 1391, 1392,
                               2580, 2585, 2592,
                                                       \descriptionlabel ..
1394, 1395, 1396,
                               2597, 2609, 2610,
                                                               ..... <u>1047</u>, 1050
1398, 1399, 1400,
                               2611, 2613, 2620,
                                                       \detokenize ..... 1496
1402, 1403, 1404,
                               2621, 2622, 2648,
                                                       \dimexpr ... 968, 987,
1406, 1407, 1408,
                               2649, 2656, 2678,
                                                               2280, 3049, 3058, 3143
                               2684, 2691, 2709,
1410, 1411, 1412,
                                                       \divide 2660, 2666, 2668,
1414, 1415, 1416,
                               2725, 2731, 2736,
                                                               2670, 2672, 2713, 2719
1418, 1419, 1420,
                               2753, 2759, 2760,
                                                       \do . . . . . . . . . . 290, 616
1422, 1423, 1424,
                               2761, 2763, 2764,
                                                       \do@url@hyp ..... 616
1426, 1427, 1428,
                               2765, 2767, 2768,
                                                       \DocInput .... 20
1430, 1431, 1432,
                               2769, 2770, 2778,
                                                       \documentclass 8,430,432
1434, 1435, 1436,
                               2779, 2780, 2781,
                                                       \dp . . . . . . . . . 2339, 2347
1438, 1439, 1440,
                               2783, 2793, 2803,
1442, 1443, 1444,
                               2810, 2813, 2814,
1450, 1453, 1454,
                               2815, 2816, 2819,
                                                       \edef .... 148, 149,
1455, 1456, 1457,
                               2823, 2845, 2852,
                                                               150, 151, 152, 470, 2075
1477, 1479, 1480,
                               2853, 2854, 2855,
                                                       \editor ..... 10, 1481
                               2861, 2871, 2882,
1481, 1487, 1530,
                                                       \egroup ..... 452,
1552, 1553, 1554,
                               2889, 2936, 2941,
                                                               797, 951, 962, 966,
1555, 1556, 1557,
                               2947, 3155, 3159,
                                                               978, 984, 1563,
1570, 1578, 1584,
                               3161, 3163, 3173,
                                                               1583, 2226, 2232,
                               3177, 3184, 3210,
1585, 1593, 1594,
                                                               2301, 2652, 2686,
1603, 1604, 1616,
                               3214, 3215, 3216,
                                                               2689, 2752, 2772,
1618, 1620, 1622,
                               3217, 3223, 3224,
                                                               2784, 2802, 2823, 2844
1624, 1626, 1628,
                               3226, 3227, 3229,
                                                       \else ... 54, 62, 70, 79,
1632, 1634, 1636,
                               3230, 3232, 3233,
                                                               87, 99, 115, 123,
1638, 1645, 1646,
                               3235, 3236, 3237,
                                                               131, 141, 198, 234,
1674, 1676, 1678,
                               3238, 3239, 3242,
                                                               336, 357, 378, 385,
```

```
390, 401, 409, 417,
                              3083, 3087, 3097,
                                                     \expandafter 335, 337,
463, 470, 473, 485,
                              3107, 3112, 3119,
                                                             649, 798, 1510,
489, 493, 498, 502,
                              3124, 3132, 3135,
                                                             1511, 1517, 1518,
514, 526, 541, 624,
                              3151, 3152, 3160,
                                                             1572, 1575, 1800,
640, 646, 648, 671,
                              3184, 3443, 3448,
                                                             1801, 1803, 1804,
673, 790, 854, 859,
                              3455, 3464, 3468, 3491
                                                             1810, 1812, 3157, 3180
885, 888, 918, 958,
                       \email .... 10, 1564,
1441, 1469, 1473,
                              2620, 2684, 2731, 2770
                                                                   F
1483, 1499, 1506,
                       \emph ..... 2194, 2196
                                                     \familydefault .... 870
1509, 1515, 1516,
                       \empty .... 2948
                                                     \fancyfoot .....
1526, 1529, 1534,
                       \EnableCrossrefs .... 18
                                                               2962, 2970, 2980,
1537, 1540, 1547,
                       \end . . . . . 21, 2887, 2917
                                                             2992, 2996, 3001,
1567, 1590, 1599,
                       \end@ACM@color@frame 2265
                                                             3025, 3052, 3063,
1605, 1613, 1653,
                       \end@dblfloat .... 976
                                                             3064, 3082, 3084,
1666, 1680, 1695,
                       \end@float .....
                                                             3088, 3098, 3109,
1701, 1704, 1715,
                       \endcsname 355, 356, 484,
                                                             3113, 3122, 3127,
1726, 1729, 1739,
                              486, 490, 497, 499,
                                                             3131, 3136, 3148, 3149
1742, 1745, 1750,
                              503, 532, 552, 553,
                                                     \fancyhead . 2957, 2958,
1784, 1809, 1814,
                              567, 581, 1512,
                                                             2959, 2960, 2965,
1815, 1816, 1819,
                              1519, 1573, 1576,
                                                             2966, 2967, 2968,
1932, 1936, 2099,
                              1800, 1801, 1803,
                                                             2974, 2976, 2977,
2105, 2131, 2142,
                              1804, 1805, 1806,
                                                             2984, 2986, 2987,
2146, 2147, 2148,
                              1807, 1810, 1812,
                                                             2988, 3002, 3003,
2160, 2161, 2169,
                              2247, 2249, 3157, 3180
                                                             3005, 3006, 3009,
2172, 2173, 2176,
                       \enddescription . . . 1054
                                                             3011, 3015, 3018,
2183, 2188, 2195,
                       \endgroup . . . 483, 522,
                                                             3026, 3027, 3029,
2200, 2203, 2204,
                              540, 555, 2217,
                                                             3030, 3033, 3035,
2208, 2209, 2210,
                              2543, 3159, 3161, 3439
                                                             3039, 3042, 3057,
2221, 2224, 2229,
                       \endlist .... 1052, 1054
                                                             3062, 3080, 3081,
2230, 2234, 2277,
                       \endMakeFramed .... 1780
                                                             3092, 3093, 3094,
2289, 2292, 2295,
                       \endminipage ..... <u>787</u>
                                                             3095, 3102, 3103,
2298, 2335, 2462,
                                                             3104, 3105, 3117,
                       \endtrivlist ..... 3376
2471, 2480, 2486,
                                                             3118, 3120, 3121,
                       \enspace ..... 3254
2487, 2502, 2504,
                                                             3125, 3126, 3142, 3147
                       environments:
2505, 2506, 2508,
                          abstract ......
                                                18
                                                      \fancyheadoffset ...
2510, 2511, 2514,
                          acks .......
                                                             . . . 3049, 3056, 3141
2581, 2598, 2601,
                          anonsuppress ....
                                                     \fancyhf .... 2944, 3074
2604, 2616, 2622,
                          CCSXML ......
                                                 16
                                                     \fancypagestyle 2943, 3073
2629, 2650, 2661,
                          marginfigure ....
                                                 35
                                                      \fi .... 56, 64, 72, 81,
2671, 2680, 2687,
                          margintable ....
                                                             89, 101, 117, 125,
2696, 2714, 2718,
                          printonly .....
                                                             133, 143, 156, 176,
2727, 2733, 2741,
                          screenonly .....
                                                             182, 195, 200, 230,
2755, 2757, 2773,
                          sidebar .....
                                                             236, 261, 262, 274,
2782, 2787, 2794,
                          teaserfigure ....
                                                             279, 292, 294, 296,
2798, 2806, 2813,
                                                             298, 300, 302, 304,
                          translatedabstract
2819, 2824, 2825,
                                                             306, 308, 310, 312,
                              2834, 2836, 2843,
                       \everypar . . . . . . 462,
                                                             314, 316, 318, 320,
2928, 2939, 2940,
                              517, 528, 2797, 2805
                                                             322, 324, 326, 328,
2950, 2961, 2969,
                       \excludecomment . 1792,
                                                             330, 332, 334, 339,
2979, 2990, 2995,
                              3447, 3449, 3453, 3454
                                                             341, 343, 345, 347,
3000, 3007, 3010,
                       \ExecuteOptionsX ...
                                                             349, 350, 359, 361,
3012, 3014, 3024,
                              . . . 50, 58, 66, 74,
                                                             375, 380, 383, 392,
3031, 3034, 3036,
                                                             396, 403, 411, 419,
                              83, 91, 103, 107,
3038, 3066, 3067,
                              111, 119, 127, 135, 145
                                                             422, 435, 450, 454,
```

```
2600, 2603, 2607,
460, 465, 470, 476,
                                                       \footnotetextauthorsaddresses
487, 491, 500, 504,
                               2618, 2634, 2635,
                                                              . . . . . . . 2143, 2150
506, 529, 530, 543,
                               2639, 2650, 2673,
                                                       \footnotetextcopyrightpermission
554, 573, 613, 617,
                               2674, 2682, 2690,
                                                               . . . . . . . 2158, 2162
                               2701, 2720, 2721,
626, 644, 646, 650,
                                                       \footrulewidth ....
653, 680, 681, 682,
                               2729, 2735, 2746,
                                                               2946, 3055, 3076, 3140
760, 776, 794, 820,
                               2755, 2757, 2777,
                                                       \foreignlanguage 438,441
832, 863, 864, 865,
                               2790, 2792, 2800,
                                                       \format ..... 32
871, 878, 887, 890,
                               2802, 2808, 2813,
                                                       944, 945, 961, 975,
                               2820, 2824, 2838,
                                                       \FrameRestore .... 1779
979, 1006, 1445,
                               2841, 2842, 2843,
                                                       \FrameSep . . . . . . . . . . 2281
                               2881, 2888, 2914,
1465, 1470, 1471,
                                                       \frenchspacing .... 3495
                               2918, 2930, 2935,
1476, 1486, 1502,
                                                       \fulltextwidth ....
1507, 1514, 1521,
                               2939, 2940, 2949,
                                                               . . . . . . <u>967</u>, 971, 987
1522, 1527, 1528,
                               2951, 2952, 2957,
1536, 1542, 1543,
                               2958, 2963, 2972,
1544, 1549, 1569,
                               2982, 2998, 2999,
                                                                    \mathbf{G}
1592, 1602, 1609,
                               3001, 3010, 3012,
                                                       \g@addto@macro ....
1615, 1631, 1659,
                               3021, 3022, 3023,
                                                               157, 438, 441, 444,
1672, 1684, 1688,
                               3025, 3034, 3036,
                                                               452, 1485, 1517,
                               3045, 3046, 3047,
1697, 1703, 1711,
                                                               1520, 1535, 1541,
1717, 1731, 1732,
                               3050, 3053, 3066,
                                                               1548, 1568, 1586,
1741, 1747, 1748,
                               3067, 3068, 3082,
                                                               1588, 1591, 1595,
1752, 1766, 1773,
                               3085, 3091, 3101,
                                                               1597, 1600, 1606,
1786, 1808, 1816,
                               3115, 3116, 3122,
                                                               1607, 1612, 1614,
1817, 1823, 1844,
                               3123, 3127, 3128,
                                                               1654, 1667, 1740,
1847, 1850, 1855,
                               3134, 3137, 3138,
                                                               1746, 1785, 1805,
1858, 1861, 1864,
                               3151, 3152, 3153,
                                                               1812, 2094, 2098,
1867, 1870, 1873,
                               3171, 3182, 3184,
                                                               2100, 2111, 2114,
1876, 1879, 1882,
                               3252, 3257, 3279,
                                                               2617, 2630, 2681,
1926, 1942, 1943,
                               3311, 3349, 3368,
                                                               2688, 2697, 2728,
2089, 2101, 2107,
                               3399, 3400, 3425,
                                                               2734, 2742, 2779, 2780
2110, 2121, 2122,
                               3426, 3432, 3443,
                                                       \gdef .... 156, 1459,
2131, 2133, 2145,
                               3451, 3457, 3460,
                                                               1460, 1461, 1462,
2152, 2153, 2154,
                               3470, 3471, 3472, 3494
                                                               1464, 1477, 1482,
2155, 2159, 2167,
                       \firstpagestyle \dots 3072
                                                               1484, 1505, 1508,
2170, 2171, 2178,
                       \floatname .....
                                                               1510, 1513, 1525,
2179, 2180, 2185,
                       \flushbottom 806, 808,
                                                               1533, 1539, 1572,
2197, 2202, 2209,
                               810, 812, 814, 817, 819
                                                               1575, 1649, 1662,
2210, 2211, 2212,
                       \footnote . . . . . . . . 2816
                                                               1689, 1721, 1738,
2213, 2214, 2215,
                       \footnotemark 596, 1586,
                                                               1744, 1783, 1788,
2216, 2218, 2222,
                               1595, 2779, 2780, 2814
                                                               1801, 1803, 1804,
2227, 2228, 2233,
                                                               1810, 2334, 2615,
                       \footnoterule .... 785
2236, 2237, 2256,
                                                               2619, 2624, 2654,
                       \footnotesep ... 571, 584
2267, 2287, 2288,
                                                               2655, 2676, 2677,
                       \footnotesize .. 577,
2291, 2294, 2297,
                                                               2679, 2683, 2685,
                               2927, 2941, 2962,
2298, 2328, 2337,
                                                               2692, 2723, 2724,
                               2970, 2980, 2992,
2349, 2375, 2401,
                                                               2726, 2730, 2732,
                               2996, 3001, 3009,
2427, 2452, 2456,
                                                               2737, 2762, 2763, 2768
                               3015, 3025, 3064,
2464, 2473, 2482,
                               3084, 3088, 3098,
                                                       \geometry . . . 686, 689,
2490, 2503, 2504,
                               3109, 3113, 3122,
                                                               696, 703, 710, 717,
2506, 2508, 2510,
                               3127, 3133, 3149, 3479
                                                               724, 731, 738, 747, 754
2511, 2514, 2516,
                       \footnotetext . . 1589,
                                                       \getrefnumber . . 1681,
2542, 2577, 2584,
                               1591, 1598, 1601, 1608
                                                               1705, 1820, 2277, 2813
```

\global	\if@ACM@acmthm . <u>67</u> , 3325	\if@ACM@pbalance 108.3379
516, 519, 555, 575,	\if@ACM@affiliation@obeypu	· · · · · · · · · · · · · · · · · · ·
876, 886, 889, 959,	1550,	1698, 2254
986, 1451, 1452,	$2487, 2504, \overline{2506},$	\if@ACM@printccs
1466, 1498, 1500,	2508, 2509, 2511, 2514	1692, 2223
1501, 1546, 2252,	\if@ACM@anonymous	\if@ACM@printfolios
2253, 2257, 2259,	120, 1504,	1712, 2949, 2951,
2273, 2286, 2496,	1516, 1523, 1547,	2957, 2958, 3001,
2498, 2503, 2507,	1567, 1587, 1596,	3025, 3082, 3122, 3127
2512, 2515, 2593,	1605, 2097, 2103,	\if@ACM@review
2594, 2595, 2612,	2119, 2148, 2937, 3452	. 75, 2866, 2883, 2890
2636, 2640, 2650,	\if@ACM@authordraft	\if@ACM@screen 51,618,3445
2702, 2705, 2747,	136, 664, 2163	\if@ACM@sigchiamode
2785, 2788, 2876,	\if@ACM@authorversion	166, 562,
2880, 3380, 3404,	84, 2169, 2189	672, 869, 969, 976,
3406, 3408, 3420, 3424	\if@ACM@badge <u>1640</u>	2131, 2133, 2650, 3048
\grantnum 25, 3442	\if@ACM@balance	\if@ACM@timestamp
\grantsponsor $25, \frac{3441}{}$	104, 3401, 3429	128, 2919, 3051, 3129
	\if@ACM@citypresent	\if@ACM@urlbreakonhyphens
H	2588, 2601	<u>59</u> , 615
\hbox . 586, 2130, 2135, 2488	\if@ACM@countrypresent	\if@acmowned 1829
\headrulewidth 2945, 3075	2590, 2604	\if@Description@present
\height	\if@ACM@engage . 167,	872,
1651, 1657, 1664, 1670	381, 394, 1933,	885, 888, 958, 2787
\hfill 2478, 2879	2174, 2218, 3008, 3032	\if@filesw 551,651
\href . 1574, 1577, 1652,	\if@ACM@instpresent	\if@insideauthorgroup
1658, 1665, 1671,	2586, 2598	1493, 1499
2076, 2077, 3463, 3467	\if@ACM@journal	\if@nobreak 461
\hrule 779, 786, 2478	163, 231, 376,	\if@noskipsec 454,518
\hsize . 578, 1778, 2129,	388, 399, 407, 415,	\if@printcopyright .
2272, 2275, 2453,	914, 1473, 1727,	1825, 2181
2455, 2457, 2466,	2494, 2773, 2796, 2804	\if@printpermission
2468, 2476, 2518,	\if@ACM@journal@bibstrip	<u>1827,</u> 2170
2638, 2648, 2704, 2749	<u>164</u> , 2173, 2193,	\if@twocolumn . $\overline{3430}$, 3472
\hskip 481, 495, 525,	2205, 2830, 2991, 3108	\if@undescribed@images
538, 542, 2489, 3373	\if@ACM@journal@bibstrip@o	
\hspace 1655,	165, 2149, 2954, 3077	\IfBeginWith 1571
1668, 1776, 1955,	\if@ACM@maketitle@typeset	\ifcase 202, 238,
1966, 1975, 1982,	448, <u>1055</u> , 1686	599, 684, 763, 801,
1989, 2003, 2015,	\if@ACM@manuscript .	921, 990, 1132,
2023, 2037, 2045,	162,	1628, 1755, 1890,
2052, 2059, 2653, 2707	271, 1724, 2172, 2186	1945, 2305, 2352,
\ht 2338, 2346	\if@ACM@natbib	2378, 2404, 2429,
\Huge . 2412, 2414, 2416,	<u>112</u> , 282, 373, 629	2519, 2547, 2662,
2418, 2420, 2422, 2424	\if@ACM@natbib@override	2715, 2891, 2955,
\hypersetup	<u>112</u>	3078, 3219, 3263,
619, 625, 627, 2241	\if@ACM@newfonts 833,844	3295, 3354, 3381, 3402
\hyphenpenalty 3478	\if@ACM@nonacm 92, 673,	\ifcsname 355
I	1680, 1704, 1819,	\ifdim 458, 478, 510, 535,
\if 336	1929, 2156, 2204,	2283, 2340, 2348, 2878
\if@ACM@acmcp <u>169</u> , 276,	2773, 2825, 2961,	\IfEq 2073, 2079,
1771, 2146, 2161,	2969, 2979, 2990,	2080, 2081, 2082,
2229, 2263, 2454,	3004, 3028, 3083,	2083, 2084, 2085, 2086
2637, 3054, 3139, 3255	3087, 3097, 3107, 3132	\IfFileExists 835, 838, 841

\IfInteger 1719	\ignorespaces	\LARGE 2406, 2408, 2410,
\ifluatex	531, 571, 584,	2426, 2437, 2439,
\ifNAT@numbers 646	876, 1554, 1555,	2441, 2443, 2445,
\ifnum 171, 177,	1557, 1570, 2492,	2449, 2554, 2557, 2572
183, 196, 470, 471,	2493, 2495, 2497,	\Large 2545, 2563,
485, 489, 498, 502,	2498, 2499, 2500,	3229, 3230, 3232,
1681, 1705, 1814,	2504, 2761, 2801,	3233, 3235, 3249, 3250
1815, 1816, 1820,	2809, 2815, 2823, 3374	\large 2164, 2550, 2555,
1840, 1845, 1848,	\immediate 553, 652	2558, 2573, 2575,
1851, 1856, 1859,	\includecomment	3223, 3224, 3226, 3227
1862, 1865, 1868,	3446, 3450, 3456	\lastbox 520, 2797, 2805
1871, 1874, 1877,	\includegraphics	\leaders 2478
1880, 2121, 2157,	1652, 1658,	\leavevmode 454, 2478, 2706
2277, 2659, 2712,	1665, 1671, 2076, 2275	\leftmargin 1031, 1036,
2754, 2756, 2813, 3130	\indent 3353	1039, 1041, 1043, 1045
\ifPDFTeX 821	\input 822	\leftmargini 1015, 1016,
\IfSubStr 1496, 1565	\InputIfFileExists 25	1017, 1018, 1031, 1032
\ifvmode 2486	\institution	\leftmarginii
\ifvoid 790	. <i>12</i> , 1555, <u>2492</u> , 2763	1021, 1022,
\ifx . 155, 237, 291, 293,	\interfootnotelinepenalty	1023, 1024, 1036, 1037
295, 297, 299, 301,	565	\leftmarginiii
303, 305, 307, 309,	\interlinepenalty	1024, 1025, 1039, 1040
311, 313, 315, 317,	482, 539, 565	\leftmarginiv
319, 321, 323, 325,	\item 3373, 3475	1025, 1026, 1041, 1042
327, 329, 331, 333,	\itshape	\leftmarginv
338, 340, 342, 344,	2175, 2177, 3216, 3217, 3238, 3239,	1026, 1027, 1043, 1044
346, 348, 384, 424,	3259, 3271, 3293, 3362	\leftmarginvi
648, 1463, 1467,	3237, 3271, 3273, 3302	1027, 1045, 1046
1469, 1481, 1503,	J	\leftskip . 2477, 2750, 3212
1506, 1524, 1526,	\jobname 550, 553	\let 312, 314,
1531, 1532, 1538,		326, 328, 330, 356,
1611, 1648, 1661,	K	472, 587, 588, 630,
1680, 1736, 1737, 1743, 1750, 1782,	\kern 778, 779, 785, 786, 2478	631, 632, 633, 634,
1800, 1809, 1819,	\keywords 15, <u>1678</u>	635, 638, 642, 800,
2108, 2142, 2147,	\keywordsname	866, 880, 881, 883, 884, 891, 892, 893,
2198, 2209, 2210,	377, 379, 389, 391,	894, 895, 896, 897,
2221, 2224, 2230,	400, 402, 408, 410,	898, 899, 900, 901,
2234, 2289, 2292,	416, 418, 1582, 2231	902, 903, 904, 905,
2295, 2298, 2333,	L	906, 907, 908, 909,
2462, 2471, 2480,	\1@section 558	910, 949, 950, 954,
2502, 2581, 2614,	\1@subsection 558, 559	955, 964, 965, 970,
2622, 2623, 2678,	\l@subsubsection 560	971, 972, 1035,
2684, 2691, 2725,	\labelenumi 998	1050, 1054, 1558,
2731, 2736, 2774,	\labelenumii 999	1559, 1560, 1561,
2782, 2794, 2819,	\labelenumiii 1000	1562, 1673, 1679,
2824, 2836, 2843,	\labelenumiv 1001	1790, 1793, 2109,
2928, 2939, 2948,		
3010, 3012, 3034,	\labelsep	2124, 2125, 2126,
	\labelsep	2124, 2125, 2126, 2127, 2139, 2140,
3036, 3066, 3067,		
3151, 3152, 3157,	1009, 1017, 1022, 1032, 1037, 1040, 1042, 1044, 1046, 3373	2127, 2139, 2140,
· · · · · · · · · · · · · · · · · · ·	1009, 1017, 1022, 1032, 1037, 1040,	2127, 2139, 2140, 2141, 2144, 2151,
3151, 3152, 3157, 3180, 3184, 3443, 3460, 3462, 3466, 3491	1009, 1017, 1022, 1032, 1037, 1040, 1042, 1044, 1046, 3373 \labelwidth 1032, 1037, 1040,	2127, 2139, 2140, 2141, 2144, 2151, 2238, 2252, 2253, 2303, 2304, 2329, 2330, 2513, 2612,
3151, 3152, 3157, 3180, 3184, 3443,	1009, 1017, 1022, 1032, 1037, 1040, 1042, 1044, 1046, 3373 \labelwidth	2127, 2139, 2140, 2141, 2144, 2151, 2238, 2252, 2253, 2303, 2304, 2329,

```
1795, 1885, 2102,
       2747, 2752, 2811,
                                    187, 188, 189, 190,
                                                                 2500, 2509, 2926,
       2812, 2846, 2847,
                                    191, 192, 193, 426,
       2849, 2850, 2858,
                                    427, 428, 429, 431,
                                                                 3201, 3433, 3442, 3458
       2859, 2860, 2862,
                                    433, 1707, 1708,
                                                          \newcount . 1489, 1491, 2869
       2863, 2864, 3162,
                                    1709, 1768, 1938, 1939
                                                          \newcounter 1794, 2922, 2924
       3164, 3166, 3167,
                             \metadata@authors ..
                                                          \newdimen ......
                                    . . . 2238, 2239, 2242
       3169, 3175, 3178,
                                                                . 280, 967, 1007, 2645
       3181, 3475, 3480,
                            \mktitle@bx 2116, 2338,
                                                          \newenvironment . 446,
       3481, 3488, 3489, 3490
                                    2339, 2342, 2346,
                                                                952, 963, 1775, 2093
\libertineLF ..... 868
                                    2347, 2354, 2356,
                                                          \newfloat .... 946
                                    2358, 2360, 2362,
\lineskip . . . . 2707, 2751
                                                          \newif 162, 163, 164, 165,
                                    2364, 2366, 2368,
\linespacing ... 548, 549
                                                                 166, 167, 169, 833,
\liningnums ..... <u>866</u>
                                    2370, 2372, 2374,
                                                                 872, 874, 1055,
\list ..... 1048
                                    2458, 2467, 2477,
                                                                 1493, 1825, 1827,
\listisep . 1029, 1030, 1034
                                    2640, 2705, 2706, 2785
                                                                 1829, 2586, 2588, 2590
                            \month ..... 1627, 2931
\label{listparindent} 1033
                                                          \newlength ......
                            \moveleft .... 986
\LoadClass ..... 264
                                                                 1640, 1642, 1643, 2868
\long 448, 563, 574, 949,
                                                          \newsavebox ..... 2867
       953, 964, 1686,
                                                          \newskip .... 1029, 2646
                             \NAT@@setcites .... 352
       1689, 1691, 2094, 2852
                                                          \newtheorem .....
                            \NAT@aysep .....
\loop .... 2341, 2875
                                                                  3328, 3331, 3334,
\LTX@adddotafter ...
                            \NAT@citetp .....
                                                                 3337, 3340, 3344, 3347
                            \NAT@close .....
       . . . . . . . 3181, 3184
                                                          \newtheoremstyle ...
                                    292, 294, 296, 298, 341
                                                                . . . . . . . . 3280, 3312
                             \NAT@cmprs . . 320, 322, 324
                                                          \newwrite ..... 552
                            \NAT@cmt .... 347
\makeatletter .... 545
                                                          \next .... 3159, 3161, 3171
                            \NAT@ctype .... 638
\makebox ..... 2164,
                                                          \nobreak ..... 511, 2821
                            \NAT@find@eq .....
                                                    335
       3057, 3062, 3142, 3147
                            \NAT@fullfalse ....
                                                          \noindent . . 561, 1583,
\MakeFramed . . . . . . . 1778
                                                                 1751, 2141, 2226,
\makelabel .... 1050
                            \NAT@longnamestrue . 332
                                                                 2232, 2307, 2309,
\MakeTextUppercase .
                            \NAT@merge . . 326, 328, 330
                                                                 2311, 2313, 2344,
                            \NAT@nmfmt .... 334
        2615, 2617, 3214,
                                                                 2351, 2458, 2460,
       3223, 3226, 3229,
                            \NAT@numbersfalse .. 306
                                                                 2463, 2472, 2478,
       3232, 3242, 3246, 3249
                            \NAT@numberstrue 308, 310
                                                                 2479, 2481, 2579,
\maketitle . . . . . 19, 2117
                            \NAT@open . . . . . . 292,
                                                                 2640, 2641, 2705,
\MakeUppercase ... 3168
                                   294, 296, 298, 339, 638
                                                                 2751, 2785, 2786,
\marginfigure .... 952
                            \NAT@partrue .... 638
                                                                 2821, 2822, 2855, 3363
                            \NAT@rem@eq .... 337
marginfigure (env.) ... 35
                                                          \noindentparagraph .
\marginpar 563, 951, 957, 966
                            \NAT@sep 300, 302, 304, 349
                                                                 . . . . . . . . 2319, 3201
\marginparsep .. 968, 3049
                            \NAT@sort . . . 316, 318, 324
                                                          \nolinkurl .... 2686,
\marginparwidth . 968, 3049
                            \NAT@superfalse . . . . 308
                                                                 2689, 2732, 2734, 2770
                            \NAT@supertrue .... 310
\margintable ..... 963
                                                          \normalbaselines ... 2649
margintable (env.) . . . . 35
                            \NAT@swafalse ....
                                                          \normalcolor .... 792
\mathchardef .. 2686, 2689
                            \NAT@up ..... 334
                                                          \normalfont .... 586,
\mbox .... 334
                            \NAT@yrsep .... 345
                                                                 1751, 2135, 2546,
\mdseries . . 2431, 2433,
                            \NeedsTeXFormat .... 1
                                                                 2551, 2560, 2561,
      2435, 2439, 2441,
                            \newblock . . . . . . . . 639
                                                                 2563, 2564, 2576,
       2443, 2445, 2447,
                            \newbox ......
       2449, 2451, 2567, 2570
                                    2116, 2269, 2484, 2644
                                                                 2872, 3274, 3291,
                                                                 3303, 3306, 3371, 3495
\medskip .. 2307, 2309,
                            \newcommand . 362, 368,
                                                          \normalparindent ... 777
       2311, 2313, 2640,
                                   423, 437, 440, 443,
                                                          \normalsize .....
       2642, 2706, 2791, 2821
                                    645, 876, 1458,
\MessageBreak ....
                                    1545, 1580, 1610,
                                                                  2428, 2546, 2560,
       173, 179, 185, 186,
                                    1647, 1660, 1735,
                                                                 2561, 2564, 2873, 3495
```

```
\n num@authorgroups ..
                                       1371, 1376, 1380,
                                                                       3276, 3277, 3278,
       ..... <u>1489</u>,
                                       1384, 1389, 1393,
                                                                       3297, 3298, 3299,
                                       1397, 1401, 1405,
                                                                       3300, 3301, 3302,
       1500, 2121, 2662,
       2666, 2668, 2715, 2756
                                       1409, 1413, 1417,
                                                                       3307, 3308, 3309,
\num@authors .....
                                                                       3310, 3356, 3357,
                                       1421, 1425, 1429,
                                       1433, 1437, 1628,
                                                                       3358, 3359, 3360,
         1491, 1498, 1512,
                                       1629, 1630, 1758,
                                                                       3361, 3364, 3365,
       1519, 1573, 1576, 2754
                                       1760, 1762, 1764,
                                                                       3366, 3367, 3383,
\number .... 470
                                       1891, 1893, 1896,
                                                                       3384, 3385, 3387,
\numberline .... 490, 503
                                       1898, 1899, 1901,
                                                                       3389, 3391, 3393,
\numexpr . 2921, 2923, 2925
                                                                       3395, 3396, 3398,
                                       1903, 1905, 1908,
\nxandlist ..... 2239
                                       1910, 1913, 1915,
                                                                       3405, 3407, 3409,
                                       1918, 1921, 1924,
                                                                       3411, 3413, 3415,
             O
                                       1946, 1957, 1968,
                                                                       3417, 3419, 3421, 3423
\onehalfspacing ....
                                       1976, 1983, 1990,
                                                               \orcid ..... 10, <u>1570</u>
\openout .....
                                                               \outer@nobreak .... 983
                                       2004, 2016, 2024,
\or .... 205, 207,
                                       2038, 2046, 2053,
       209, 212, 214, 216,
                                       2060, 2065, 2071,
                                                                            P
       218, 220, 223, 226,
                                       2308, 2310, 2312,
                                                               \p@ . . . . . . . . . 556, 761,
       241, 243, 245, 247,
                                       2314, 2316, 2318,
                                                                       768, 778, 779, 785,
       249, 251, 253, 255,
                                       2320, 2322, 2324,
                                                                       786, 3055, 3140,
       257, 259, 601, 602,
                                       2326, 2355, 2357,
                                                                       3186, 3190, 3194,
       603, 604, 605, 606,
                                       2359, 2361, 2363,
                                                                       3195, 3198, 3199,
       608, 609, 611, 612,
                                       2365, 2367, 2369,
                                                                       3202, 3203, 3207,
       688, 695, 702, 709,
                                       2371, 2373, 2381,
                                                                       3208, 3371, 3473, 3476
       716, 723, 730, 737,
                                       2383, 2385, 2387,
                                                               \PackageError 56, 64, 72,
       746, 753, 765, 766,
                                       2389, 2391, 2393,
                                                                       81, 89, 101, 105,
       767, 769, 770, 771,
                                       2395, 2397, 2399,
                                                                       109, 117, 125, 133, 143
       772, 773, 774, 775,
                                       2407, 2409, 2411,
                                                               \PackageInfo .... 53,
       803, 804, 805, 807,
                                       2413, 2415, 2417,
                                                                       55, 61, 63, 69, 71,
       809, 811, 813, 815,
                                       2419, 2421, 2423,
                                                                       77, 80, 86, 88, 94,
       816, 818, 923, 924,
                                       2425, 2432, 2434,
                                                                       100, 114, 116, 122,
       925, 926, 927, 929,
                                       2436, 2438, 2440,
                                                                       124, 130, 132, 138,
       932, 937, 942, 943,
                                       2442, 2444, 2446,
                                                                       142, 1176, 1220,
       992, 993, 994, 995,
                                       2448, 2450, 2522,
                                                                       1226, 1240, 1246, 1252
       996, 997, 1002,
                                       2524, 2526, 2528,
                                                               \PageIndex . . . . . . . . . 15
       1003, 1004, 1005,
                                       2530, 2532, 2534,
                                                               \pageref .... 2933
       1137, 1141, 1145,
                                       2536, 2538, 2540,
                                                               \pagestyle .... 3070
       1149, 1153, 1157,
                                       2549, 2552, 2553,
       1162, 1166, 1170,
                                                               \par .... 438,
                                       2556, 2559, 2562,
       1177, 1181, 1185,
                                                                       441, 455, 511, 547,
                                       2565, 2568, 2571,
                                                                       788, 981, 1583,
       1189, 1194, 1198,
                                       2574, 2664, 2665,
       1202, 1206, 1211.
                                                                       1751. 2144. 2151.
                                       2667, 2669, 2717,
       1215, 1221, 1227,
                                                                       2170, 2175, 2177,
                                       2894, 2896, 2898,
       1231, 1235, 1241,
                                                                       2226, 2232, 2275,
                                       2900, 2902, 2904,
                                                                       2290, 2293, 2296,
       1247, 1253, 1257,
                                       2906, 2908, 2910,
       1261, 1266, 1270,
                                                                       2307, 2309, 2311,
                                       2912, 2964, 2973,
       1274, 1278, 1282,
                                                                       2313, 2354, 2356,
                                       2983, 3086, 3096,
                                                                       2358, 2370, 2374,
       1286, 1290, 1294,
                                       3106, 3221, 3222,
                                                                       2463, 2465, 2472,
       1298, 1302, 1306,
                                       3225, 3228, 3231,
                                                                       2475, 2478, 2481,
       1310, 1314, 1318,
                                       3234, 3240, 3244,
       1322, 1326, 1330,
                                                                       2483, 2506, 2508,
                                       3248, 3251, 3265,
       1334, 1338, 1342,
                                                                       2510, 2511, 2579,
                                       3266, 3267, 3268,
                                                                       2583, 2640, 2642,
       1346, 1350, 1354,
                                       3269, 3270, 3275,
       1358, 1362, 1366,
                                                                       2649, 2651, 2679,
```

```
2681, 2688, 2697,
                                           R
                                                            \renewcommand 284, 288,
       2706, 2708, 2726,
                                                                    289, 292, 294, 296,
                              \raggedright .....
       2728, 2734, 2742,
                                      2459, 2477, 2750, 3477
                                                                    298, 300, 302, 304,
       2750, 2752, 2783,
                                                                    354, 377, 379, 382,
                              \raisebox ......
       2784, 2785, 2787,
                                                                    389, 391, 393, 395,
                                       1651, 1657, 1664,
       2801, 2821, 2844,
                                                                    400, 402, 404, 408,
                                     1670, 2164, 3058, 3143
       2848, 2852, 2855, 3369
                                                                    410, 412, 416, 418,
                              \real@adddotafter ..
                                     . . . . . . . . 3166, 3169
\paragraph .... 3197
                                                                    420, 870, 1047,
                                                                    1495, 1564, 2095,
\parbox ..... 668,
                              \realSectionformat .
                                                                    2128, 2766, 2945,
       677, 2459, 2469, 2872
                                     . . . 3162, 3174, 3175
                                                                    2946, 3055, 3075,
\parindent . . <u>761</u>, 777,
                              \received . . . . . . 19, <u>1735</u>
                                                                    3076, 3140, 3185,
       1016, 2144, 2151,
                              \RecordChanges .... 17
       2168, 2274, 3197,
                                                                    3189, 3193, 3197, 3206
                              \ref .... 2833, 2840
       3213, 3260, 3292, 3476
                                                             \renewenvironment ..
                              \refname ..... 285, 286
                                                                     948, 1048, 1685, 3369
\parskip . . <u>761</u>, 2168, 3476
                              \refstepcounter .... 474
                                                             \repeat ..... 2348, 2878
\part .... 3206
                              \relax ..... 171,
\PassOptionsToClass
                                                             \RequirePackage . . 29,
                                     177, 183, 196, 203,
       . . . . . . . . . 158, 159
                                                                    30, 31, 265, 266,
                                     239, 281, 335, 336,
\pdfgentounicode ... 830
                                                                    267, 268, 269,
                                     424, 456, 475, 477,
                                                                         272,
\pdfglyphtounicode .
                                                                    270,
                                                                                 275.
                                     481, 495, 509, 524,
       . . . . . . 823, 824,
                                                                    277, 278, 283, 386,
                                     534, 542, 553, 600,
       825, 826, 827, 828, 829
                                                                    589, 590, 654, 655,
                                     685, 764, 800, 802,
                                                                    665, 674, 683, 780,
\pdfstringdefDisableCommands
                                     922, 991, 1133,
                                                                    831, 845, 851, 852,
       . . . . . . . . . . . . . 591
                                     1467, 1490, 1492,
                                                                    856, 857, 860, 861,
\phantomsection ....
                                     1498, 1500, 1610,
                                                                    862, 912, 1791,
       . . . . 286, 2795, 3437
                                     1611, 1681, 1705,
                                                                    2857, 3386, 3388,
\popQED ..... 3376
                                     1756, 1779, 1800,
                                                                    3390, 3392, 3394,
\position . . . 12, 1554,
                                     1809, 1819, 1820,
                                                                    3397, 3410, 3412,
       1558, 1559, 1560,
                                     1840, 1845, 1848,
                                                                    3414, 3416, 3418, 3422
       1561, 1562, <u>2492</u>, 2761
                                     1851, 1856, 1859,
                                                             \reset@font .... 564, 577
\postcode .....
                                     1862, 1865, 1868,
                                                             \reversemarginpar .. 745
       . 12, 1561, 2492, 2760
                                     1871, 1874, 1877,
                                                            \rightarrow ..... 1797
printonly (env.) .... 24
                                     1880, 1890, 1945,
\ProcessOptionsX ... 160
                                                            \rightskip ..... 3211
                                     2139, 2140, 2157,
\proof ..... <u>3369</u>
                                                             \rotatebox . . . . 3059, 3144
                                     2282, 2283, 2286,
                                                             \rule ..... 571, 584
\proofname .... 3369
                                     2306, 2353, 2379,
\protect ..... 490, 503
                                     2405, 2430, 2520,
                                                                         S
\protected@edef ....
                                     2548, 2647, 2657,
       . . . . . . 475, 566, 580
                                     2658, 2659, 2660,
                                                             \savebox ..... 2872
\protected@write ... 2285
                                     2663, 2666, 2668,
                                                            screenonly (env.) . . . . . 24
                                                             \scriptsize 2276, 2875, 2879
\providecommand ....
                                     2670, 2672, 2675,
       . . . . . 639, 643, 3258
                                                            \scshape .... 3261, 3352
                                     2707, 2710, 2711,
\ProvidesClass ..... 5
                                     2712, 2713, 2716,
                                                             \section ..... 285,
\ProvidesFile ..... 3
                                     2719, 2722, 2754,
                                                                    2315, 2317, 2321,
\ps@headings .. 2860, 2864
                                     2756, 2779, 2813,
                                                                    2323, 2325, 2327,
\ps@myheadings 2859, 2863
                                     2870, 2892, 2893,
                                                                    2799, 2807, 3185, 3436
                                     2895, 2897, 2913,
\ps@plain . . . . 2858, 2862
                                                             \section@raggedright
                                     2923, 2925, 2928,
\pushQED ..... 3370
                                                                    ..... 3210,
                                     2956, 3079, 3130,
\put ..... 2886, 2916
                                                                    3214, 3215, 3223,
                                     3157, 3180, 3184,
                                                                    3224, 3226, 3227,
            Q
                                     3220, 3264, 3296,
                                                                    3229, 3230, 3232,
\qed . . . . . . . . . . . . . . 3370
                                     3355, 3371, 3382,
                                                                    3233, 3235, 3236,
\quad .... 532, 2975,
                                     3403, 3462, 3466, 3476
                                                                    3237. 3242. 3243.
       2978, 2985, 2989, 3131 \removelastskip . . . . 547
                                                                    3246, 3247, 3249, 3250
```

\Sectionformat	\shortauthors 19, 1524,	\textrightarrow
3158, 3162, 3164, 3175	1525, 1532, 1533,	595, 1797, 1811
\SelectFootnoteRule	1535, 1538, 1539,	\textwidth 968, 987, 988,
781, 783	1541, 2251, 2253, 2940	2129, 2453, 2466,
\selectlanguage 1581, 2803	\shortcite 642,645	2476, 2518, 2657, 2704
\set@ACM@acmcpbox	\shorttitle 2960, 2968,	\thanks 14, 2095, 2852
2264, 2269	2978, 2989, 3002, 3026	\thankses
——————————————————————————————————————	\showeprint 3458	2098, 2100, 2142, 2852
\setbox 520, 575,	\sidebar 946	\the 1512, 1519, 1573,
986, 2273, 2342,	sidebar (env.)	1576, 1625, 1627,
2458, 2467, 2477,	, ,	2286, 2875, 2879, 2931
2488, 2640, 2650,	\skip 791	
2705, 2785, 2797, 2805	\small 564, 951,	\theACM@time@hours .
\setcctype 16, <u>1885</u>	958, 966, 1751,	2925, 2932
\setcitestyle	2307, 2309, 2311,	\theACM@time@minutes 2932
<i>26</i> , 289, 363, 369	2313, 2551, 2576,	\theenumi 998
\setcopyright <i>16</i> , <u>1883</u>	2797, 2805, 2821, 3082	\theenumii 999
\setcounter 2134, 2219,	\smallskipamount 1030	\theenumiii 1000
2336, 2923, 2925,	\smash 1650, 1656, 1663, 1669	\theenumiv <u>1001</u>
	\space 499, 1497,	\thefootnote 2128
3218, 3241, 3245, 3256	1566, 1710, 2247,	\theindex 3472
\setengagemetadata .	2514, 3066, 3151,	\theoremstyle
19, <u>2113</u>	3443, 3482, 3485, 3493	3323, 3326, 3342, 3350
\setkeys . 38, 175, 181,	\specialcomment 3434	\thepage
1450, 1722, 1770,	\standardpagestyle . 2942	2933, 2949, 2951,
1883, 2625, 2626,	\startPage 15, 1674	2957, 2958, 3001,
2631, 2632, 2693,	\state . 12, 1560, 2492, 2765	3025, 3082, 3122, 3127
2694, 2698, 2699,		
2738, 2739, 2743, 2744	\stepcounter 1589, 1591,	\thispagestyle 2343, 2350
\setlength 761, 762, 768,	1598, 1601, 1608, 1799	\thmname 3290, 3322
777, 1009, 1010,	\StrDel 2501	\thmnote 3290, 3322
1015, 1021, 1024,	\streetaddress	\thmnumber 3290, 3322
1025, 1026, 1027,	. 12, 1558, <u>2492</u> , 2759	\thr@@ 330
1641, 1644, 2274, 2874	\string . 426, 427, 430,	\time 2920, 2923, 2925
	432, 652, 1497,	\title 10, 2817
\setmonofont 853, 858	1566, 1632, 1676,	\titlenote <i>14</i> , <u>1585</u> , <u>2818</u>
\settopmatter	1710, 2286, 2817,	\topsep 1034, 1038, 3371
18, 98, 1710,	2818, 3482, 3485, 3493	\translatedabstract 446
<u>1722</u> , 1723, 1725,	\strut 3060, 3145	translatedabstract
1728, 1730, 1733, 2829	\strutbox 571, 584	(env.)
\setTrue 546	\subsection 3189	\translatedkeywords
\SetWatermarkColor .	\subsubsection 3193	
667, 676	\subtitle 10, 1487	\translatedsubtitle
\SetWatermarkFontSize	\subtitlenote 14, 1594	
666, 675	(Subtriction : 11, <u>1371</u>	\translatedtitle . $21, \frac{440}{437}$
\SetWatermarkText 668,677	Т	\trivlist
\sfdefault 870	\teaserfigure 2093	
		\tw@
\sffamily 2406, 2408,	teaserfigure (env.) 18	\two@digits 2931, 2932
2410, 2412, 2414,	\terms	\twocolumn . 2360, 2362,
2416, 2420, 2424,	\textbf 1802, 1814, 2855	2364, 2366, 2368, 2372
2426, 2545, 2550,	\textbullet 594, 1801,	
2554, 2575, 2941,	2975, 2978, 2985, 2989	U
3214, 3215, 3216,	\textheight 2340, 2342,	\unskip 523, 593,
3223, 3224, 3226,	2348, 2878, 3058, 3143	789, 1557, 1563,
3227, 3232, 3233,	\textit 1815,	1570, 2489, 2492,
3242, 3243, 3246, 3247	2831, 2835, 2836, 2837	2493, 2495, 2497,

2498, 2499, 2500,	\vbox 575, 986,	Z
2514, 2583, 2759,	2273, 2458, 2467,	\z@ 318, 322, 458,
2760, 2761, 2763,	2477, 2640, 2705, 2785	478, 510, 520, 535,
2764, 2765, 2766,	\vskip 512, 547, 791, 799, 981	548, 571, 584, 762,
2767, 2768, 2770,	\vspace 2284, 3480	799, 916, 920, 931,
2815, 2823, 2840, 2853	\vsplit 2342	1015, 1021, 1033,
\unvbox . 576, 793, 798,	\vtop 2650	2144, 2151, 2164,
2344, 2640, 2706, 2785		2168, 2257, 2259,
\upshape 1047	W	2274, 2750, 2797,
\url . 1783, 1785, 1927, 3443	\wd 988, 2489	2805, 2945, 2946,
\UrlBreakPenalty	\write 652	3057, 3062, 3075,
2686, 2689	\WIIte 032	3076, 3142, 3147,
\urlstyle 598, 607, 610	V	3185, 3189, 3193,
\usebox 2886, 2916	X	3201, 3206, 3213,
\usepackage	\xdef 339,	3272, 3304, 3473, 3476
9, 10, 11, 12, 13, 14	341, 343, 345, 347, 349	\z@skip 547, 981, 1038, 3212
		\zposy 2280, 2281
V	Y	\zrefused 2278, 2279
\value 1816	\year 1625, 2931	\zsaveposy 1779, 2299