

SIG Proceedings Paper in LaTeX Format*

Extended Abstract[†]

Ben Trovato[‡]

Institute for Clarity in Documentation
Dublin, Ohio
trovato@corporation.com

G.K.M. Tobin[§]

Institute for Clarity in Documentation
Dublin, Ohio
webmaster@marysville-ohio.com

Lars Thørvæld[¶]

The Thørvæld Group
Hekla, Iceland
larst@affiliation.org

Valerie Béranger

Inria Paris-Rocquencourt
Rocquencourt, France

Aparna Patel

Rajiv Gandhi University
Doimukh, Arunachal Pradesh, India

Huifen Chan

Tsinghua University
Haidian Qu, Beijing Shi, China

Charles Palmer

Palmer Research Laboratories
San Antonio, Texas
cpalmer@prl.com

John Smith

The Thørvæld Group
jsmith@affiliation.org

Julius P. Kumquat

The Kumquat Consortium
jpkumquat@consortium.net



Figure 1: This is a teaser

*Produces the permission block, and copyright information

[†]The full version of the author's guide is available as `acmart.pdf` document

[‡]Dr. Trovato insisted his name be first.

[§]The secretary disavows any knowledge of this author's actions.

[¶]This author is the one who did all the really hard work.

This article was authored by employees of the Government of Canada. As such, the Canadian government retains all interest in the copyright to this work and grants to ACM a nonexclusive, royalty-free right to publish or reproduce this article, or to allow others to do so, provided that clear attribution is given both to the authors and the Canadian government agency employing them. Permission to make digital or hard copies for personal or 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 specific permission and/or a fee. Request permissions from `permissions@acm.org`.

WOODSTOCK'97, July 1997, El Paso, Texas USA

© 2016 Crown in Right of Canada. Publication rights licensed to ACM.

ACM ISBN 123-4567-24-567/08/06...\$15.00

https://doi.org/10.475/123_4

ABSTRACT

This paper provides a sample of a \LaTeX document which conforms, somewhat loosely, to the formatting guidelines for ACM SIG Proceedings.

CCS CONCEPTS

• **Computer systems organization** → **Embedded systems**; *Redundancy*; Robotics; • **Networks** → Network reliability;

KEYWORDS

ACM proceedings, \LaTeX , text tagging

ACM Reference Format:

Ben Trovato, G.K.M. Tobin, Lars Thørvæld, Valerie Béranger, Aparna Patel, Huifen Chan, Charles Palmer, John Smith, and Julius P. Kumquat. 1997. SIG Proceedings Paper in LaTeX Format: Extended Abstract. In *Proceedings of ACM Woodstock conference (WOODSTOCK'97)*. ACM, New York, NY, USA, 6 pages. https://doi.org/10.475/123_4

1 INTRODUCTION

The *proceedings* are the records of a conference.¹ ACM seeks to give these conference by-products a uniform, high-quality appearance. To do this, ACM has some rigid requirements for the format of the proceedings documents: there is a specified format (balanced double columns), a specified set of fonts (Arial or Helvetica and Times Roman) in certain specified sizes, a specified live area, centered on the page, specified size of margins, specified column width and gutter size.

2 THE BODY OF THE PAPER

Typically, the body of a paper is organized into a hierarchical structure, with numbered or unnumbered headings for sections, subsections, sub-subsections, and even smaller sections. The command `\section` that precedes this paragraph is part of such a hierarchy.² \LaTeX handles the numbering and placement of these headings for you, when you use the appropriate heading commands around the titles of the headings. If you want a sub-subsection or smaller part to be unnumbered in your output, simply append an asterisk to the command name. Examples of both numbered and unnumbered headings will appear throughout the balance of this sample document.

Because the entire article is contained in the **document** environment, you can indicate the start of a new paragraph with a blank line in your input file; that is why this sentence forms a separate paragraph.

Type Changes and *Special Characters*

We have already seen several typeface changes in this sample. You can indicate italicized words or phrases in your text with the command `\textit`; boldening with the command `\textbf` and typewriter-style (for instance, for computer code) with `\texttt`. But remember, you do not have to indicate typestyle changes when such changes are part of the *structural* elements of your article; for instance, the heading of this subsection will be in a sans serif³ typeface, but that is handled by the document class file. Take care with the use of⁴ the curly braces in typeface changes; they mark the beginning and end of the text that is to be in the different typeface.

You can use whatever symbols, accented characters, or non-English characters you need anywhere in your document; you can find a complete list of what is available in the *\LaTeX User's Guide* [26].

¹This is a footnote

²This is a footnote.

³Another footnote here. Let's make this a rather long one to see how it looks.

⁴Another footnote.

Math Equations

You may want to display math equations in three distinct styles: inline, numbered or non-numbered display. Each of the three are discussed in the next sections.

Inline (In-text) Equations. A formula that appears in the running text is called an inline or in-text formula. It is produced by the **math** environment, which can be invoked with the usual `\begin . . . \end` construction or with the short form `$. . . $`. You can use any of the symbols and structures, from α to ω , available in \LaTeX [26]; this section will simply show a few examples of in-text equations in context. Notice how this equation: $\lim_{n \rightarrow \infty} x = 0$, set here in in-line math style, looks slightly different when set in display style. (See next section).

Display Equations. A numbered display equation—one set off by vertical space from the text and centered horizontally—is produced by the **equation** environment. An unnumbered display equation is produced by the **displaymath** environment.

Again, in either environment, you can use any of the symbols and structures available in \LaTeX ; this section will just give a couple of examples of display equations in context. First, consider the equation, shown as an inline equation above:

$$\lim_{n \rightarrow \infty} x = 0 \quad (1)$$

Notice how it is formatted somewhat differently in the **displaymath** environment. Now, we'll enter an unnumbered equation:

$$\sum_{i=0}^{\infty} x + 1$$

and follow it with another numbered equation:

$$\sum_{i=0}^{\infty} x_i = \int_0^{\pi+2} f \quad (2)$$

just to demonstrate \LaTeX 's able handling of numbering.

Citations

Citations to articles [6–8, 19], conference proceedings [8] or maybe books [26, 34] listed in the Bibliography section of your article will occur throughout the text of your article. You should use BibTeX to automatically produce this bibliography; you simply need to insert one of several citation commands with a key of the item cited in the proper location in the `.tex` file [26]. The key is a short reference you invent to uniquely identify each work; in this sample document, the key is the first author's surname and a word from the title. This identifying key is included with each item in the `.bib` file for your article.

The details of the construction of the .bib file are beyond the scope of this sample document, but more information can be found in the *Author's Guide*, and exhaustive details in the *LaTeX User's Guide* by Lamport [26].

This article shows only the plainest form of the citation command, using \cite.

Some examples. A paginated journal article [2], an enumerated journal article [11], a reference to an entire issue [10], a monograph (whole book) [25], a monograph/whole book in a series (see 2a in spec. document) [18], a divisible-book such as an anthology or compilation [13] followed by the same example, however we only output the series if the volume number is given [14] (so Editor00a's series should NOT be present since it has no vol. no.), a chapter in a divisible book [37], a chapter in a divisible book in a series [12], a multi-volume work as book [24], an article in a proceedings (of a conference, symposium, workshop for example) (paginated proceedings article) [4], a proceedings article with all possible elements [36], an example of an enumerated proceedings article [16], an informally published work [17], a doctoral dissertation [9], a master's thesis: [5], an online document / world wide web resource [1, 30, 38], a video game (Case 1) [29] and (Case 2) [28] and [27] and (Case 3) a patent [35], work accepted for publication [31], 'YYYYb'-test for prolific author [32] and [33]. Other cites might contain 'duplicate' DOI and URLs (some SIAM articles) [23]. Boris / Barbara Beeton: multi-volume works as books [21] and [20].

A couple of citations with DOIs: [22, 23].

Online citations: [38-40].

Tables

Because tables cannot be split across pages, the best placement for them is typically the top of the page nearest their initial cite. To ensure this proper "floating" placement of tables, use the environment **table** to enclose the table's contents and the table caption. The contents of the table itself must go in the **tabular** environment, to be aligned properly in rows and columns, with the desired horizontal and vertical rules. Again, detailed instructions on **tabular** material are found in the *LaTeX User's Guide*.

Immediately following this sentence is the point at which Table 1 is included in the input file; compare the placement of the table here with the table in the printed output of this document.

To set a wider table, which takes up the whole width of the page's live area, use the environment **table*** to enclose the table's contents and the table caption. As with a single-column table, this wide table will "float" to a location deemed more desirable. Immediately following this sentence is the point at which Table 2 is included in the input file; again, it is instructive to compare the placement of the table here with the table in the printed output of this document.

Table 1: Frequency of Special Characters

Non-English or Math	Frequency	Comments
∅	1 in 1,000	For Swedish names
π	1 in 5	Common in math
\$	4 in 5	Used in business
Ψ ₁ ²	1 in 40,000	Unexplained usage



Figure 2: A sample black and white graphic.



Figure 3: A sample black and white graphic that has been resized with the includegraphics command.

It is strongly recommended to use the package booktabs [15] 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.

Figures

Like tables, figures cannot be split across pages; the best placement for them is typically the top or the bottom of the page nearest their initial cite. To ensure this proper "floating" placement of figures, use the environment **figure** to enclose the figure and its caption.

This sample document contains examples of .eps files to be displayable with LaTeX. If you work with pdfLaTeX, use files in the .pdf format. Note that most modern TeX systems will convert .eps to .pdf for you on the fly. More details on each of these are found in the *Author's Guide*.

As was the case with tables, you may want a figure that spans two columns. To do this, and still to ensure proper "floating" placement of tables, use the environment **figure*** to enclose the figure and its caption. And don't forget to end the environment with **figure***, not **figure**!

Table 2: Some Typical Commands

Command	A Number	Comments
<code>\author</code>	100	Author
<code>\table</code>	300	For tables
<code>\table*</code>	400	For wider tables

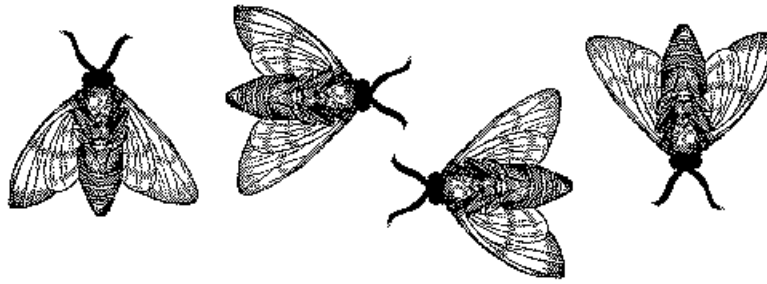


Figure 4: A sample black and white graphic that needs to span two columns of text.

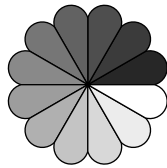


Figure 5: A sample black and white graphic that has been resized with the `includegraphics` command.

Theorem-like Constructs

Other common constructs that may occur in your article are the forms for logical constructs like theorems, axioms, corollaries and proofs. ACM uses two types of these constructs: theorem-like and definition-like.

Here is a theorem:

THEOREM 2.1. *Let f be continuous on $[a, b]$. If G is an anti-derivative for f on $[a, b]$, then*

$$\int_a^b f(t) dt = G(b) - G(a).$$

Here is a definition:

Definition 2.2. If z is irrational, then by e^z we mean the unique number that has logarithm z :

$$\log e^z = z.$$

The pre-defined theorem-like constructs are **theorem**, **conjecture**, **proposition**, **lemma** and **corollary**. The pre-defined definition-like constructs are **example** and **definition**. You can add your own constructs using the `amsthm`

interface [3]. The styles used in the `\theoremstyle` command are **acmplain** and **acmdefinition**.

Another construct is **proof**, for example,

PROOF. Suppose on the contrary there exists a real number L such that

$$\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = L.$$

Then

$$l = \lim_{x \rightarrow c} f(x) = \lim_{x \rightarrow c} \left[gx \cdot \frac{f(x)}{g(x)} \right] = \lim_{x \rightarrow c} g(x) \cdot \lim_{x \rightarrow c} \frac{f(x)}{g(x)} = 0 \cdot L = 0,$$

which contradicts our assumption that $l \neq 0$. \square

3 CONCLUSIONS

This paragraph will end the body of this sample document. Remember that you might still have Acknowledgments or Appendices; brief samples of these follow. There is still the Bibliography to deal with; and we will make a disclaimer about that here: with the exception of the reference to the \LaTeX book, the citations in this paper are to articles which have nothing to do with the present subject and are used as examples only.

A HEADINGS IN APPENDICES

The rules about hierarchical headings discussed above for the body of the article are different in the appendices. In the **appendix** environment, the command **section** is used to indicate the start of each Appendix, with alphabetic order designation (i.e., the first is A, the second B, etc.) and a title (if you include one). So, if you need hierarchical structure *within* an Appendix, start with **subsection** as the highest

level. Here is an outline of the body of this document in Appendix-appropriate form:

Introduction

The Body of the Paper

Type Changes and Special Characters.

Math Equations.

Inline (In-text) Equations.

Display Equations.

Citations.

Tables.

Figures.

Theorem-like Constructs.

A Caveat for the \TeX Expert.

Conclusions

References

Generated by bibtex from your .bib file. Run latex, then bibtex, then latex twice (to resolve references) to create the .bbl file. Insert that .bbl file into the .tex source file and comment out the command `\thebibliography`.

B MORE HELP FOR THE HARDY

Of course, reading the source code is always useful. The file `acmart.pdf` contains both the user guide and the commented code.

ACKNOWLEDGMENTS

The authors would like to thank Dr. Yuhua Li for providing the MATLAB code of the *BEPS* method.

The authors would also like to thank the anonymous referees for their valuable comments and helpful suggestions. The work is supported by the National Natural Science Foundation of China under Grant No.: 61273304 and Young Scientists' Support Program (<http://www.nnsf.cn/youngscientists>).

REFERENCES

- [1] Rafal Ablamowicz and Bertfried Fauser. 2007. CLIFFORD: a Maple 11 Package for Clifford Algebra Computations, version 11. Retrieved February 28, 2008 from <http://math.ntech.edu/rafal/cliff11/index.html>
- [2] Patricia S. Abril and Robert Plant. 2007. The patent holder's dilemma: Buy, sell, or troll? *Commun. ACM* 50, 1 (Jan. 2007), 36–44. <https://doi.org/10.1145/1188913.1188915>
- [3] American Mathematical Society 2015. *Using the amsthm Package*. American Mathematical Society. <http://www.ctan.org/pkg/amsthm>.
- [4] Sten Andler. 1979. Predicate Path expressions. In *Proceedings of the 6th. ACM SIGACT-SIGPLAN symposium on Principles of Programming Languages (POPL '79)*. ACM Press, New York, NY, 226–236. <https://doi.org/10.1145/567752.567774>

- [5] David A. Anisi. 2003. *Optimal Motion Control of a Ground Vehicle*. Master's thesis. Royal Institute of Technology (KTH), Stockholm, Sweden.
- [6] Mic Bowman, Saumya K. Debray, and Larry L. Peterson. 1993. Reasoning About Naming Systems. *ACM Trans. Program. Lang. Syst.* 15, 5 (November 1993), 795–825. <https://doi.org/10.1145/161468.161471>
- [7] Johannes Braams. 1991. Babel, a Multilingual Style-Option System for Use with LaTeX's Standard Document Styles. *TUGboat* 12, 2 (June 1991), 291–301.
- [8] Malcolm Clark. 1991. Post Congress Tristesse. In *TeX90 Conference Proceedings*. TeX Users Group, 84–89.
- [9] Kenneth L. Clarkson. 1985. *Algorithms for Closest-Point Problems (Computational Geometry)*. Ph.D. Dissertation. Stanford University, Palo Alto, CA. UMI Order Number: AAT 8506171.
- [10] Jacques Cohen (Ed.). 1996. Special issue: Digital Libraries. *Commun. ACM* 39, 11 (Nov. 1996).
- [11] Sarah Cohen, Werner Nutt, and Yehoshua Sagie. 2007. Deciding equivalences among conjunctive aggregate queries. *J. ACM* 54, 2, Article 5 (April 2007), 50 pages. <https://doi.org/10.1145/1219092.1219093>
- [12] Bruce P. Douglass, David Harel, and Mark B. Trakhtenbrot. 1998. Statecharts in use: structured analysis and object-orientation. In *Lectures on Embedded Systems*, Grzegorz Rozenberg and Frits W. Vaandrager (Eds.). Lecture Notes in Computer Science, Vol. 1494. Springer-Verlag, London, 368–394. https://doi.org/10.1007/3-540-65193-4_29
- [13] Ian Editor (Ed.). 2007. *The title of book one* (1st. ed.). The name of the series one, Vol. 9. University of Chicago Press, Chicago. <https://doi.org/10.1007/3-540-09237-4>
- [14] Ian Editor (Ed.). 2008. *The title of book two* (2nd. ed.). University of Chicago Press, Chicago, Chapter 100. <https://doi.org/10.1007/3-540-09237-4>
- [15] Simon Fear. 2005. *Publication quality tables in \LaTeX* . <http://www.ctan.org/pkg/booktabs>.
- [16] Matthew Van Gundy, Davide Balzarotti, and Giovanni Vigna. 2007. Catch me, if you can: Evading network signatures with web-based polymorphic worms. In *Proceedings of the first USENIX workshop on Offensive Technologies (WOOT '07)*. USENIX Association, Berkley, CA, Article 7, 9 pages.
- [17] David Harel. 1978. *LOGICS of Programs: AXIOMATICS and DESCRIPTIVE POWER*. MIT Research Lab Technical Report TR-200. Massachusetts Institute of Technology, Cambridge, MA.
- [18] David Harel. 1979. *First-Order Dynamic Logic*. Lecture Notes in Computer Science, Vol. 68. Springer-Verlag, New York, NY. <https://doi.org/10.1007/3-540-09237-4>
- [19] Maurice Herlihy. 1993. A Methodology for Implementing Highly Concurrent Data Objects. *ACM Trans. Program. Lang. Syst.* 15, 5 (November 1993), 745–770. <https://doi.org/10.1145/161468.161469>
- [20] Lars Hörmander. 1985. *The analysis of linear partial differential operators. III*. Grundlehren der Mathematischen Wissenschaften [Fundamental Principles of Mathematical Sciences], Vol. 275. Springer-Verlag, Berlin, Germany. viii+525 pages. Pseudodifferential operators.
- [21] Lars Hörmander. 1985. *The analysis of linear partial differential operators. IV*. Grundlehren der Mathematischen Wissenschaften [Fundamental Principles of Mathematical Sciences], Vol. 275. Springer-Verlag, Berlin, Germany. vii+352 pages. Fourier integral operators.
- [22] IEEE 2004. IEEE TCSC Executive Committee. In *Proceedings of the IEEE International Conference on Web Services (ICWS '04)*. IEEE Computer Society, Washington, DC, USA, 21–22. <https://doi.org/10.1109/ICWS.2004.64>
- [23] Markus Kirschmer and John Voight. 2010. Algorithmic Enumeration of Ideal Classes for Quaternion Orders. *SIAM J. Comput.* 39, 5 (Jan. 2010), 1714–1747. <https://doi.org/10.1137/080734467>
- [24] Donald E. Knuth. 1997. *The Art of Computer Programming, Vol. 1: Fundamental Algorithms (3rd. ed.)*. Addison Wesley Longman Publishing

531	Co., Inc.	584
532	[25] David Kosiur. 2001. <i>Understanding Policy-Based Networking</i> (2nd. ed.). Wiley, New York, NY.	585
533	[26] Leslie Lamport. 1986. <i>TeX: A Document Preparation System</i> . Addison-Wesley, Reading, MA.	586
534	[27] Newton Lee. 2005. Interview with Bill Kinder: January 13, 2005. Video.	587
535	<i>Comput. Entertain.</i> 3, 1, Article 4 (Jan.-March 2005). https://doi.org/10.1145/1057270.1057278	588
536	[28] Dave Novak. 2003. Solder man. Video. In <i>ACM SIGGRAPH 2003 Video Review on Animation theater Program: Part I - Vol. 145 (July 27-27, 2003)</i> .	589
537	ACM Press, New York, NY, 4. https://doi.org/99.9999/woot07-S422	590
538	[29] Barack Obama. 2008. A more perfect union. Video. Retrieved March 21, 2008 from http://video.google.com/videoplay?docid=6528042696351994555	591
539	[30] Poker-Edge.Com. 2006. Stats and Analysis. Retrieved June 7, 2006 from http://www.poker-edge.com/stats.php	592
540	[31] Bernard Rous. 2008. The Enabling of Digital Libraries. <i>Digital Libraries</i> 12, 3, Article 5 (July 2008). To appear.	593
541	[32] Mehdi Saeedi, Morteza Saheb Zamani, and Mehdi Sedighi. 2010. A library-based synthesis methodology for reversible logic. <i>Microelectron. J.</i> 41, 4 (April 2010), 185–194.	594
542	[33] Mehdi Saeedi, Morteza Saheb Zamani, Mehdi Sedighi, and Zahra Sasanian. 2010. Synthesis of Reversible Circuit Using Cycle-Based Approach. <i>J. Emerg. Technol. Comput. Syst.</i> 6, 4 (Dec. 2010).	595
543	[34] S.L. Salas and Einar Hille. 1978. <i>Calculus: One and Several Variable</i> . John Wiley and Sons, New York.	596
544	[35] Joseph Scientist. 2009. The fountain of youth. Patent No. 12345, Filed July 1st., 2008, Issued Aug. 9th., 2009.	597
545	[36] Stan W. Smith. 2010. An experiment in bibliographic mark-up: Parsing metadata for XML export. In <i>Proceedings of the 3rd. annual workshop on Librarians and Computers (LAC '10)</i> , Reginald N. Smythe and Alexander Noble (Eds.), Vol. 3. Paparazzi Press, Milan Italy, 422–431. https://doi.org/99.9999/woot07-S422	598
546	[37] Asad Z. Spector. 1990. Achieving application requirements. In <i>Distributed Systems</i> (2nd. ed.), Sape Mullender (Ed.). ACM Press, New York, NY, 19–33. https://doi.org/10.1145/90417.90738	599
547	[38] Harry Thornburg. 2001. Introduction to Bayesian Statistics. Retrieved March 2, 2005 from http://ccrma.stanford.edu/~jos/bayes/bayes.html	600
548	[39] TUG 2017. Institutional members of the TeX Users Group. Retrieved May 27, 2017 from http://wwtug.org/instmemb.html	601
549	[40] Boris Veytsman. [n. d.]. acmart—Class for typesetting publications of ACM. Retrieved May 27, 2017 from http://www.ctan.org/pkg/acmart	602
550		603
551		604
552		605
553		606
554		607
555		608
556		609
557		610
558		611
559		612
560		613
561		614
562		615
563		616
564		617
565		618
566		619
567		620
568		621
569		622
570		623
571		624
572		625
573		626
574		627
575		628
576		629
577		630
578		631
579		632
580		633
581		634
582		635
583		636