

# *Use Cases in Big Data Software and Analytics*

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*Bloomington, Indiana*

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# My great Big Dat Paper

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

This is my Intro

## 2 THE BODY OF THE PAPER

## 3 CONCLUSIONS

This is my conclusion.

## ACKNOWLEDGMENTS

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

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## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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 [1].

## ACKNOWLEDGMENTS

The authors would like to thank

## REFERENCES

- [1] 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>

# What Separates "Big Data" from "Lots of Data"

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## ABSTRACT

In this paper, we will briefly analyze the history of data to show how having "lots of data" stored in large databases hardly differs from data storage and analysis in the early days of SQL, or even before computers. We then explain how "big data" represents a paradigmatic shift from traditional large data storage and analysis. We conclude that organizations that do not understand this paradigmatic shift are more likely to fail in big data projects.

## KEYWORDS

i523

## 1 INTRODUCTION

This is my introduction. [1]

## 2 CONCLUSIONS

I conclude that...

## ACKNOWLEDGMENTS

Generic acknowledgements

## REFERENCES

- [1] Carl Lagoze. 2014. Big Data, data integrity, and the fracturing of the control zone. *Big Data and Society* (NO 2014). <https://doi.org/10.1177/2053951714558281>

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## 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care

<sup>1</sup>Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

with the use of 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* [25].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , available in  $\LaTeX$  [25]; 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).

**2.2.2 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:

$$\lim_{n \rightarrow \infty} x = 0 \tag{1}$$

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:

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

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

### 2.3 Citations

Citations to articles [6–8, 18], conference proceedings [8] or maybe books [25, 33] 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 [25]. 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 *L<sup>A</sup>T<sub>E</sub>X User's Guide* by L<sup>A</sup>mpert [25].

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) [24], a monograph/whole book in a series (see 2a in spec. document) [17], 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 [36], a chapter in a divisible book in a series [12], a multi-volume work as book [23], an article in a proceedings (of a conference, symposium, workshop for example) (paginated proceedings article) [4], a proceedings article with all possible elements [35], an example of an enumerated proceedings article [15], an informally published work [16], a doctoral dissertation [9], a master's thesis: [5], an online document / world wide web resource [1, 29, 37], a video game (Case 1) [28] and (Case 2) [27] and [26] and (Case 3) a patent [34], work accepted for publication [30], 'YYYYb'-test for prolific author [31] and [32]. Other cites might contain 'duplicate' DOI and URLs (some SIAM articles) [22]. Boris / Barbara Beeton: multi-volume works as books [20] and [19].

A couple of citations with DOIs: [21, 22].

Online citations: [37–39].

We use jabref to manage all citations. A paper without managing a bib file will be returned without review. in the bibtex file all urls are added to rfernces with the url filed. They are not to be included in the *howpublished* or *note* field.

## 2.4 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 antiderivative 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 L<sup>A</sup>T<sub>E</sub>X book, the citations in this paper are to articles which have nothing to do with the present subject and are used as examples only.

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.

## 4 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>).

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# My great Big Dat Paper

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## ABSTRACT

This paper

## KEYWORDS

ACM proceedings,  $\text{\LaTeX}$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the [1]

## 2 THE BODY OF THE PAPER

Typically, the body of a

## 3 CONCLUSIONS

This paragraph wi [? ]

## ACKNOWLEDGMENTS

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

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# My great Big Dat Paper

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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 [1].

## ACKNOWLEDGMENTS

The authors would like to thank

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# Big Data Analytics and Edge Computing

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## ABSTRACT

With the exponential increase in the number of connected IoT devices, the data generated by these devices has grown enormously. Sending this data to a centralized server or cloud results in enormous network traffic and may lead to failures and increased latency. One solution of this problem is to do some processing on the edge devices. This is extremely helpful in providing responsive and real time analytics.

## 1 INTRODUCTION

With the rapid increase in the acceptance of Internet of Things (IoT) devices across various fields in the world, ranging from industrial sensors to lifestyle and sports products, and the consequent increase in the data generated by such devices, there is a pressing demand for devices and processes that can analyze this data and provide responsive analytics.[1]. With increase in the number of such devices, it gets increasingly difficult to perform all analytics on a server in a traditional manner. Thus, more recent approaches aim to push a part of this computation closer to the end user of the device, or closer to the edge.

## REFERENCES

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# My great Big Dat Paper

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## ABSTRACT

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

## KEYWORDS

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# Big Data Analytics using Spark

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care

<sup>1</sup>Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

with the use of 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].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , 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).

**2.2.2 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:

$$\lim_{n \rightarrow \infty} x = 0 \tag{1}$$

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:

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

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

### 2.3 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 *L<sup>A</sup>T<sub>E</sub>X User's Guide* by L<sup>A</sup>mpport [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].

We use jabref to manage all citations. A paper without managing a bib file will be returned without review. in the bibtex file all urls are added to rfernces with the url filed. They are not to be included in the *howpublished* or *note* field.

## 2.4 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 *L<sup>A</sup>T<sub>E</sub>X 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.

[Table 1 about here.]

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 2 about here.]

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.

## 2.5 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 L<sup>A</sup>T<sub>E</sub>X. If you work with pdfL<sup>A</sup>T<sub>E</sub>X, use files in the .pdf format. Note that most modern T<sub>E</sub>X systems will convert .eps to .pdf for you on the fly. More details on each of these are found in the *Author's Guide*.

[Figure 1 about here.]

[Figure 2 about here.]

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**!

[Figure 3 about here.]

[Figure 4 about here.]

## 2.6 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 antiderivative 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:

### A.1 Introduction

### A.2 The Body of the Paper

A.2.1 *Type Changes and Special Characters.*

A.2.2 *Math Equations.*

*Inline (In-text) Equations.*

*Display Equations.*

A.2.3 *Citations.*

A.2.4 *Tables.*

A.2.5 *Figures.*

A.2.6 *Theorem-like Constructs.*

*A Caveat for the  $\TeX$  Expert.*

### A.3 Conclusions

### A.4 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

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## REFERENCES

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Figure 1: A sample black and white graphic.



Figure 2: A sample black and white graphic that has been resized with the includegraphics command.

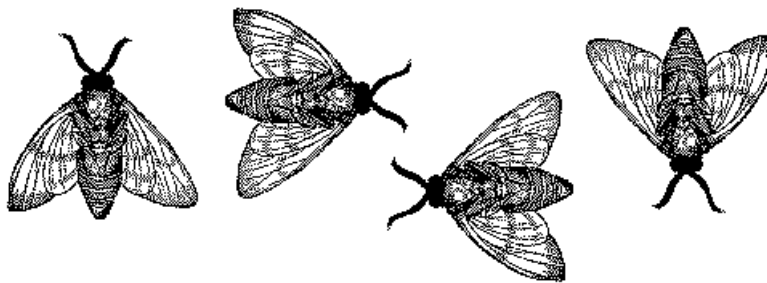


Figure 3: A sample black and white graphic that needs to span two columns of text.

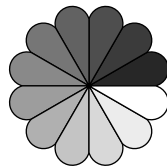


Figure 4: A sample black and white graphic that has been resized with the includegraphics command.

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**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# Big Data Analytics and High Performance Computing

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## ABSTRACT

This paper showcases the effects of Big Data on High Performance Computing and tries to find how they are related to each other.

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

This is an intro [1]

## 2 THE BODY OF THE PAPER

## 3 CONCLUSIONS

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## ACKNOWLEDGMENTS

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# My great Big Dat Paper

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

## 2 CONCLUSIONS

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### A.1 Introduction

### A.2 The Body of the Paper

A.2.1 *Type Changes and Special Characters.*

A.2.2 *Math Equations.*

*Inline (In-text) Equations.*

*Display Equations.*

A.2.3 *Citations.*

A.2.4 *Tables.*

A.2.5 *Figures.*

A.2.6 *Theorem-like Constructs.*

*A Caveat for the  $\TeX$  Expert.*

## A.3 Conclusions

## A.4 References

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## 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.

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# Big Data and Deep Learning

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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.

## ACKNOWLEDGMENTS

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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>).

# Big Data Application in Web Search and Text Mining

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## ABSTRACT

This paper studies data analytic steps in web search, and analyze some of popular approaches & algorithms (e.g. Hubs, PageRank, etc) within big data and their application in web search aspect.

## KEYWORDS

web search, text mining, PageRank

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care

<sup>1</sup>Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

with the use of 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].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , 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).

**2.2.2 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:

$$\lim_{n \rightarrow \infty} x = 0 \tag{1}$$

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:

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

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

### 2.3 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 *L<sup>A</sup>T<sub>E</sub>X User's Guide* by L<sup>A</sup>mp<sup>o</sup>rt [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], 'YYYY'-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].

We use `jabref` to manage all citations. A paper without managing a bib file will be returned without review. in the `bibtex` file all urls are added to `rfernces` with the `url` filed. They are not to be included in the `howpublished` or `note` field.

## 2.4 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 *L<sup>A</sup>T<sub>E</sub>X 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.

[Table 1 about here.]

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 2 about here.]

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.

## 2.5 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 L<sup>A</sup>T<sub>E</sub>X. If you work with pdfL<sup>A</sup>T<sub>E</sub>X, use files in the .pdf format. Note that most modern T<sub>E</sub>X systems will convert .eps to .pdf for you on the fly. More details on each of these are found in the *Author's Guide*.

[Figure 1 about here.]

[Figure 2 about here.]

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**!

[Figure 3 about here.]

[Figure 4 about here.]

## 2.6 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 antiderivative 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

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

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

### 3 CONCLUSIONS

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Figure 1: A sample black and white graphic.



Figure 2: A sample black and white graphic that has been resized with the `includegraphics` command.

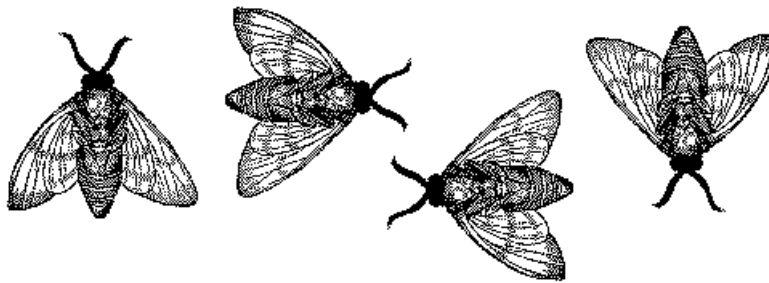


Figure 3: A sample black and white graphic that needs to span two columns of text.

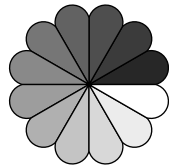


Figure 4: A sample black and white graphic that has been resized with the `includegraphics` command.

## LIST OF TABLES

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**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# Automated Information Extraction in Electronic Health Records

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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. [1]

## ACKNOWLEDGMENTS

The authors would like to

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# Distributed Environment For Parallel Neural Networks

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# Big Data Analysis using MapReduce

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## ABSTRACT

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# My great Big Dat Paper

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## ACKNOWLEDGMENTS

The authors would like to thank

# Big Data and basketball

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## ABSTRACT

This paper studies data analytic in match of basketball, and analyze actual performance in a different way.

## KEYWORDS

basketball, stats

## 1 INTRODUCTION

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## 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care

<sup>1</sup>Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

with the use of 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].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , 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).

**2.2.2 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:

$$\lim_{n \rightarrow \infty} x = 0 \tag{1}$$

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:

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

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

### 2.3 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 *L<sup>A</sup>T<sub>E</sub>X User's Guide* by L<sup>A</sup>mpport [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].

We use jabref to manage all citations. A paper without managing a bib file will be returned without review. in the bibtex file all urls are added to rfernces with the url filed. They are not to be included in the *howpublished* or *note* field.

## 2.4 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 *L<sup>A</sup>T<sub>E</sub>X 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.

[Table 1 about here.]

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 2 about here.]

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.

## 2.5 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 L<sup>A</sup>T<sub>E</sub>X. If you work with pdfL<sup>A</sup>T<sub>E</sub>X, use files in the .pdf format. Note that most modern T<sub>E</sub>X systems will convert .eps to .pdf for you on the fly. More details on each of these are found in the *Author's Guide*.

[Figure 1 about here.]

[Figure 2 about here.]

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**!

[Figure 3 about here.]

[Figure 4 about here.]

## 2.6 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 antiderivative 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:

#### A.1 Introduction

#### A.2 The Body of the Paper

A.2.1 *Type Changes and Special Characters.*

A.2.2 *Math Equations.*

*Inline (In-text) Equations.*

*Display Equations.*

A.2.3 *Citations.*

A.2.4 *Tables.*

A.2.5 *Figures.*

A.2.6 *Theorem-like Constructs.*

*A Caveat for the  $\TeX$  Expert.*

#### A.3 Conclusions

#### A.4 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.

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**Figure 1: A sample black and white graphic.**

**Figure 2: A sample black and white graphic that has been resized with the `includegraphics` command.**

**Figure 3: A sample black and white graphic that needs to span two columns of text.**

**Figure 4: A sample black and white graphic that has been resized with the `includegraphics` command.**

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**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# Big Data and Artificial Neural Networks

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## ABSTRACT

This is my abstract.

## KEYWORDS

ACM proceedings,  $\text{\LaTeX}$ , text tagging

## 1 INTRODUCTION

This is my Introduction

## 2 CONCLUSIONS

This is my Conclusion

## ACKNOWLEDGMENTS

The authors would like to thank Dr. Gregor von Laszewski for all the help he has provided for this paper.

# Big Data Analytics in Sports - Track and Field

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## ABSTRACT

This paper covers the impact that Big Data has and could have on the sport of track and field.

## KEYWORDS

i523

## 1 INTRODUCTION

This is my introduction

## 2 THE BODY OF THE PAPER

This is the body of my paper

## 3 CONCLUSIONS

This is my conclusion

## ACKNOWLEDGMENTS

Acknowledgments

# Big Data's influence on ecommerce and lifestyle

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## ABSTRACT

This paper studies how big data is applied in ecommerce and its influence on lifestyle.

## KEYWORDS

big data, ecommerce

## 1 INTRODUCTION

This is my introduction

### 1.1 Citations

Citations to articles [? ]

## ACKNOWLEDGMENTS

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

## REFERENCES



# Big Data Analytic Architecture for Real Time Traffic Control

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

This is a introduction.

## 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care with the use of 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].

<sup>1</sup>Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

## 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , 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).

**2.2.2 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:

$$\lim_{n \rightarrow \infty} x = 0 \tag{1}$$

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:

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

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

## 2.3 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 *L<sup>A</sup>T<sub>E</sub>X User's Guide* by L<sup>A</sup>mpport [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].

We use jabref to manage all citations. A paper without managing a bib file will be returned without review. in the bibtex file all urls are added to rfernces with the url filed. They are not to be included in the *howpublished* or *note* field.

## 2.4 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 *L<sup>A</sup>T<sub>E</sub>X 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.

[Table 1 about here.]

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 2 about here.]

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.

## 2.5 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 L<sup>A</sup>T<sub>E</sub>X. If you work with pdfL<sup>A</sup>T<sub>E</sub>X, use files in the .pdf format. Note that most modern T<sub>E</sub>X 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**!

## 2.6 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 antiderivative 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

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

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

### 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 L<sup>A</sup>T<sub>E</sub>X 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:

#### A.1 Introduction

#### A.2 The Body of the Paper

A.2.1 *Type Changes and Special Characters.*

A.2.2 *Math Equations.*

*Inline (In-text) Equations.*

*Display Equations.*

A.2.3 *Citations.*

A.2.4 *Tables.*

A.2.5 *Figures.*

A.2.6 *Theorem-like Constructs.*

*A Caveat for the T<sub>E</sub>X Expert.*

#### A.3 Conclusions

#### A.4 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>).

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**Table 2: Some Typical Commands**

Command	A Number	Comments
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<code>\table*</code>	400	For wider tables

# SIG Proceedings Paper in LaTeX Format

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care with the use of 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].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , 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).

**2.2.2 Display Equations.** A numbered display equation—one set off by vertical space from the text and centered horizontally—is

<sup>1</sup> Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

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.

## 2.3 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].

We use `\jabref` to manage all citations. A paper without managing a bib file will be returned without review. in the bibtex file all urls are added to `rfernces` with the `url` filed. They are not to be included in the *howpublished* or *note* field.

## 2.4 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.

[Table 1 about here.]

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 2 about here.]

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.

## 2.5 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 `pdf $\LaTeX$` , 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*.

[Figure 1 about here.]

[Figure 2 about here.]

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**!

[Figure 3 about here.]

[Figure 4 about here.]



## 2.6 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 antiderivative 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 L<sup>A</sup>T<sub>E</sub>X 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:

### A.1 Introduction

### A.2 The Body of the Paper

#### A.2.1 Type Changes and Special Characters.

#### A.2.2 Math Equations.

#### Inline (In-text) Equations.

#### Display Equations.

#### A.2.3 Citations.

#### A.2.4 Tables.

#### A.2.5 Figures.

#### A.2.6 Theorem-like Constructs.

#### A Caveat for the T<sub>E</sub>X Expert.

## A.3 Conclusions

## A.4 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>).

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Figure 1: A sample black and white graphic.



Figure 2: A sample black and white graphic that has been resized with the includegraphics command.

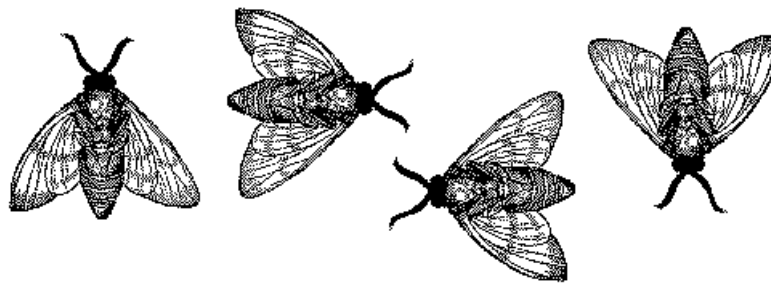


Figure 3: A sample black and white graphic that needs to span two columns of text.

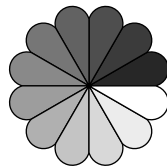


Figure 4: A sample black and white graphic that has been resized with the includegraphics command.

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**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# My great Big Dat Paper

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\text{\LaTeX}$ , text tagging

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The *proceedings* are the records of a conference. 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.

## ACKNOWLEDGMENTS

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# Big Data Applications in Electric Power Distribution

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## ABSTRACT

Now-a-days, the process of storing the power measurements have changed. Conventional meters are replaced by the smart meters. New distribution management systems like SCADA and AMI are implemented to monitor power distribution. These smart meters record the readings and communicate the data to the server. However, these systems are designed to generate the readings very frequently i.e., 15 minutes to an hour. Upon that, smart meters are being deployed at every possible location to improve the accuracy of the data. This advancements in electric power distribution system results in enormous amounts of data which requires advance analytics to process, analyse and store data. This paper discusses about the implementation of Big Data technologies, challenges of implementing Big Data in Electric Power Distribution Systems. [1]

## KEYWORDS

Big Data, Power Distribution, Smart Power

## 1 INTRODUCTION

Volume of data is increasing. According to forbes, it is said that, world's data utilization will increase to 44 zettabytes from the current utilization of 4.4 zettabytes. To process this data, Big Data analytics will be useful. But, instantiating a big data architecture is not easy task.

In electrical Power Distribution industry, data deluge is picking its pace. The data which was recorded for month, is now being noted for very small intervals. This quadruples the amount of data that should be process. There is a lot of potential work to be put in for designing a good Big Data architecture to process and analyse this data. Most of the power generation units are developing their infrastructure to support these designs.

### 1.1 Data Sources

Smart meters which are placed at customer's vicinity will record the consumption of a specific group of customers. This data can be used to analyse the behaviour of customer for certain circumstances of weather and environment.

Distribution systems which manage the distribution of power, generate large amount of data related to voltages and currents at various levels of distribution. This data is very important in analysing the load level and demand for the distribution circle.

Power measuring units at generation. This data is used to analyse the behaviour of generator and amount of power generation that will be required to supply enough power. This data will be used to decide the functioning of generators.

Old market data will be used to analyse the pricing and marketing strategies. These data is more focused on users and their behaviour.

## 1.2 4 v's in Big Data in Power Distribution System

Volume: The data is periodically generated by many data sources like smart meters, machines and other appliances. Variety: Each data source in electric power distribution system is explicit to each other. Each source has its own frequency of data generation and its own method of data generation. Thus, the data is heterogeneous. Velocity: is the speed at which the data is available for the end user. Veracity: It deals with the correctness of the data. As all the data collected by sensors, meter tend to have various losses, correction algorithms should be defined to find the accurate data. Their might be chances for data transfer losses.

## REFERENCES

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# My First paper

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## ABSTRACT

This paper edit by zzc

## KEYWORDS

info523 big data

## 1 INTRODUCTION

this is the introduction

## 2 THE BODY OF THE PAPER

this is the body of the paper

## 3 CONCLUSIONS

This is the conclusion

## ACKNOWLEDGMENTS

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# My great Big Dat Paper

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

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ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care with the use of 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].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , 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).

**2.2.2 Display Equations.** A numbered display equation—one set off by vertical space from the text and centered horizontally—is

<sup>1</sup> Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

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.

## 2.3 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].

We use `jabref` to manage all citations. A paper without managing a bib file will be returned without review. in the bibtex file all urls are added to `rfernces` with the `url` filed. They are not to be included in the *howpublished* or *note* field.

## 2.4 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.

[Table 1 about here.]

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 2 about here.]

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.

## 2.5 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 `pdf $\LaTeX$` , 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*.

[Figure 1 about here.]

[Figure 2 about here.]

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**!

[Figure 3 about here.]

[Figure 4 about here.]

## 2.6 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 antiderivative 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:

### A.1 Introduction

### A.2 The Body of the Paper

#### A.2.1 Type Changes and Special Characters.

#### A.2.2 Math Equations.

#### Inline (In-text) Equations.

#### Display Equations.

#### A.2.3 Citations.

#### A.2.4 Tables.

#### A.2.5 Figures.

#### A.2.6 Theorem-like Constructs.

#### A Caveat for the $\TeX$ Expert.

## A.3 Conclusions

## A.4 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>).

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Figure 1: A sample black and white graphic.



Figure 2: A sample black and white graphic that has been resized with the `includegraphics` command.

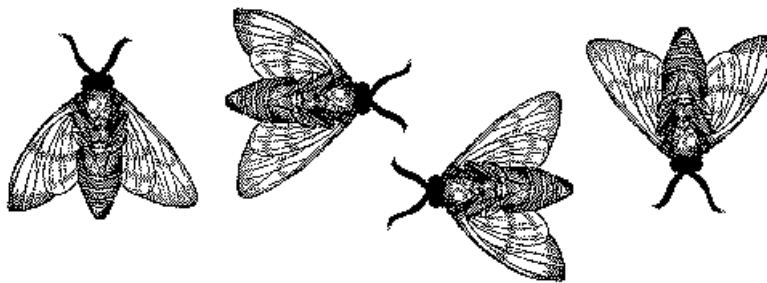


Figure 3: A sample black and white graphic that needs to span two columns of text.

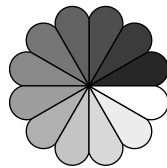


Figure 4: A sample black and white graphic that has been resized with the `includegraphics` command.

LIST OF TABLES

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**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# Using Big Data for Fact Checking

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## ABSTRACT

This paper intends to discuss how Big Data can be used to spot fake news, bad data used by politicians, advertisers, and scientists.

## KEYWORDS

ACM proceedings,  $\text{\LaTeX}$ , text tagging

## 1 INTRODUCTION

Big Data can be used to spot fake news, bad data used by politicians, advertisers, and scientists.

## ACKNOWLEDGMENTS

I thank all the people who made this possible

# Big Data Analytics in Sports - Soccer

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## ABSTRACT

The aim of this paper is to provide an understanding as to how big data is playing a huge role in Football clubs helping them scout players.

## KEYWORDS

Big Data, Soccer , Scouting

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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.

# Big Data Applications in Media and Entertainment Industry

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## ABSTRACT

This paper

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the [3]

## 2 THE BODY OF THE PAPER

Typically, the body of a [1]

## 3 CONCLUSIONS

This paragraph wi [2]

## ACKNOWLEDGMENTS

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

## REFERENCES

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# Big Data Analytics in Tourism Industry

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## ABSTRACT

This paper focuses on how the tourism industry has been impacted by the development of the Internet and improvements in information and communication technologies and how big data analytic can influence tourism research.

## KEYWORDS

Big data analytics, tourism

## 1 INTRODUCTION

this is my introduction [1].

## 2 CONCLUSIONS

This my conclusion.

## ACKNOWLEDGMENTS

The authors would like to thank I523.

## REFERENCES

- [1] G. Chareyron, J. Da-Rugna, and T. Raimbault. 2014. Big data: A new challenge for tourism. In *2014 IEEE International Conference on Big Data (Big Data)*. 5–7. <https://doi.org/10.1109/BigData.2014.7004475>

# My great Big Dat Paper

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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 [1].

## ACKNOWLEDGMENTS

The authors would like to thank

## REFERENCES

- [1] 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>

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# Big Data Analytics for Municipal Waste Management

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## ABSTRACT

As waste management becomes a greater concern for cities and municipalities around the world, big data analysis has the potential to not only help assess the current waste management strategies, but also provide information that can be used to optimize the systems used in various institutions, local government, companies, etc.

## KEYWORDS

Waste Management, Big Data, Local Government

## 1 INTRODUCTION

Concept of waste management

Solid Waste Management (SWM) is a set of consistent and systematic regulations related to control generation, storage, collection, transportation, processing and land filling of wastes according to the best public health principles, economy, preservation of resources, aesthetics, other environmental requirements and what the public attends to [1]

Managing solid waste is one of the most essential services which often fails due to rapid urbanization along with changes in the waste quantity and composition. Quantity and composition vary from country to country making them difficult to adopt for waste management system which may be successful at other places. Quantity and composition of solid waste vary from place to place [3]

## 2 OPPORTUNITIES FOR WASTE MANAGEMENT OPTIMIZATION

By collecting and storing data related to types of waste, quantities, periodicity and composition.

### 2.1 GIS Analytics

## 3 STATISTICS AND WASTE MANAGEMENT

While rural area usually generates organic and biodegradable, urban area produces waste influenced by culture and practices of society. [3] p47 to 63

There are many data analysis methods that are used when studying waste management, but the two most popular are PCA and PLS1. [2]

decision makers should distinguish between optimal, good, and fortuitous decision-making. In the optimal decision making, one can solve the optimal problem using the techniques available in other fields. In this solution method, generally some constraints (criteria) are considered, where the function(s) is to be optimized through applying some methods. Good decision-making is done based on experience, trial and error or comparison between different options of the integrated SWM. Although it is possible to choose

decisions close to the optimal state using this decision-making method, today these methods are not applicable due to increased number of different combinations in the decision-making process. In the fortuitous decision-making, since decisions are made with no scientific base, so the results are not acceptable [1]

The process of solving a math program requires a large number of calculations and is, therefore, best performed by a computer program. Lingo is a mathematical modeling language designed particularly for formulating and solving a wide variety of optimization problems including linear programming. Lingo optimization software uses branch and bound methods to solve problems of this type. [1]

## 4 CONCLUSIONS

Working on this

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## A 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.

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## ABSTRACT

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

## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care with the use of 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* [?].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , available in  $\LaTeX$  [?]; 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).

**2.2.2 Display Equations.** A numbered display equation—one set off by vertical space from the text and centered horizontally—is

<sup>1</sup> Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

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.

## 2.3 Citations

Citations to articles [? ? ? ?], conference proceedings [? ] or maybe books [? ? ] 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 [? ]. 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 [? ].

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

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

A couple of citations with DOIs: [? ? ].

Online citations: [? ? ? ].

We use jabref to manage all citations. A paper without managing a bib file will be returned without review. in the bibtex file all urls are added to rfernces with the url filed. They are not to be included in the *howpublished* or *note* field.

## 2.4 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 ?? is included in the input file; compare the placement of the table here with the table in the printed output of this document.

[Table 1 about here.]

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 ?? 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 2 about here.]

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

## 2.5 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 pdf $\LaTeX$ , 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*.

[Figure 1 about here.]

[Figure 2 about here.]

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**!

[Figure 3 about here.]

[Figure 4 about here.]

## 2.6 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 antiderivative 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 [?]. 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  $\text{\LaTeX}$  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:

### A.1 Introduction

### A.2 The Body of the Paper

A.2.1 *Type Changes and Special Characters.*

A.2.2 *Math Equations.*

*Inline (In-text) Equations.*

*Display Equations.*

A.2.3 *Citations.*

A.2.4 *Tables.*

A.2.5 *Figures.*

A.2.6 *Theorem-like Constructs.*

*A Caveat for the  $\text{\TeX}$  Expert.*

## A.3 Conclusions

## A.4 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>).

## List of Figures



Figure 1: A sample black and white graphic.



Figure 2: A sample black and white graphic that has been resized with the includegraphics command.

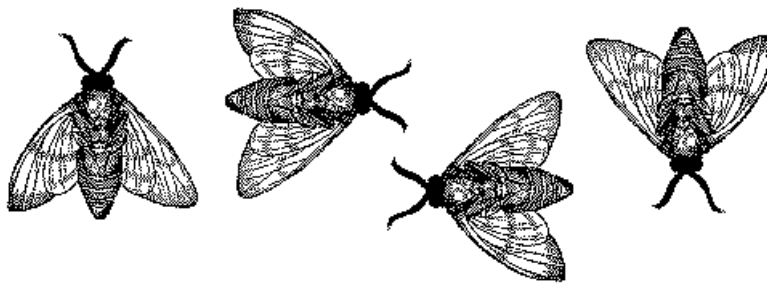


Figure 3: A sample black and white graphic that needs to span two columns of text.

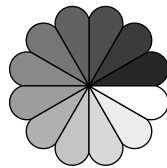


Figure 4: A sample black and white graphic that has been resized with the includegraphics command.



List of Tables

**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# My great Big Dat Paper

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

## KEYWORDS

i523

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# Big Data Applications In Population Health Management

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## ABSTRACT

My abstract will go here

## KEYWORDS

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# Big Data and Artificial Intelligence solutions for In Home, Community and Territory Security

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## ABSTRACT

Analyze audio, video data (captured continuously using voice, video sensors) and then provide analytics to homeowners/authorities/agencies as needed.

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**2.2.1 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  $\alpha$  to  $\omega$ , available in L<sup>A</sup>T<sub>E</sub>X [? ]; 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).

**2.2.2 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 L<sup>A</sup>T<sub>E</sub>X; this section will just give a couple of examples of display equations in context. First, consider the equation, shown as an inline equation above:

$$\lim_{n \rightarrow \infty} x = 0 \tag{1}$$

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:

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

just to demonstrate L<sup>A</sup>T<sub>E</sub>X's able handling of numbering.

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Citations to articles [? ? ? ? ], conference proceedings [? ] or maybe books [? ? ] 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 [?]. 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.

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

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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 2 about here.]

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

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[Figure 3 about here.]

[Figure 4 about here.]

## 2.6 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 antiderivative 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 [?]. 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

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

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  $\text{\LaTeX}$  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:

### A.1 Introduction

### A.2 The Body of the Paper

A.2.1 *Type Changes and Special Characters.*

A.2.2 *Math Equations.*

*Inline (In-text) Equations.*

*Display Equations.*

A.2.3 *Citations.*

A.2.4 *Tables.*

A.2.5 *Figures.*

A.2.6 *Theorem-like Constructs.*

*A Caveat for the  $\text{\TeX}$  Expert.*

### A.3 Conclusions

### A.4 References

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## 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

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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



## LIST OF FIGURES

1	A sample black and white graphic.	5
2	A sample black and white graphic that has been resized with the <code>includegraphics</code> command.	5
3	A sample black and white graphic that needs to span two columns of text.	5
4	A sample black and white graphic that has been resized with the <code>includegraphics</code> command.	5

**Figure 1: A sample black and white graphic.**

**Figure 2: A sample black and white graphic that has been resized with the `includegraphics` command.**

**Figure 3: A sample black and white graphic that needs to span two columns of text.**

**Figure 4: A sample black and white graphic that has been resized with the `includegraphics` command.**

## LIST OF TABLES

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**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# My great Big Dat Paper

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## ABSTRACT

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## KEYWORDS

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The *proceedings* are the records of a conference. 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 [1].

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# SIG Proceedings Paper in LaTeX Format

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

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ACM proceedings,  $\LaTeX$ , text tagging

## 1 INTRODUCTION

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## 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.  $\LaTeX$  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.

### 2.1 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`; emboldening 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 serif<sup>1</sup> typeface, but that is handled by the document class file. Take care with the use of 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].

### 2.2 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.

**2.2.1 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  $\alpha$  to  $\omega$ , 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).

**2.2.2 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:

<sup>1</sup> Another footnote here. Let's make this a rather long one to see how it looks. Footnotes must be avoided.

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

Notice how it is formatted somewhat differently in the **display-math** 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.

## 2.3 Citations

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Here is a theorem:



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

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Then

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

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

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## LIST OF FIGURES

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Figure 1: A sample black and white graphic.



Figure 2: A sample black and white graphic that has been resized with the `includegraphics` command.

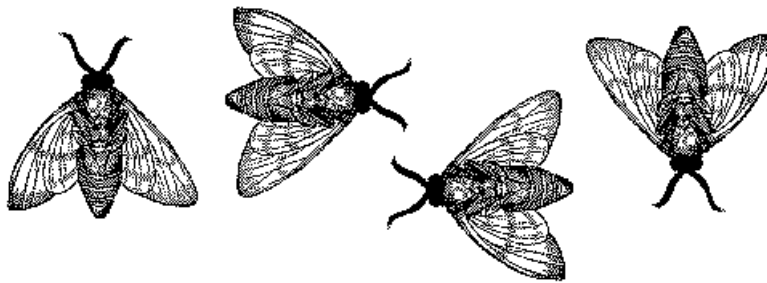


Figure 3: A sample black and white graphic that needs to span two columns of text.

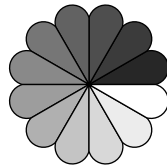


Figure 4: A sample black and white graphic that has been resized with the `includegraphics` command.

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**Table 1: Frequency of Special Characters**

Non-English or Math	Frequency	Comments
$\emptyset$	1 in 1,000	For Swedish names
$\pi$	1 in 5	Common in math
\$	4 in 5	Used in business
$\Psi_1^2$	1 in 40,000	Unexplained usage

**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

# My great Big Dat Paper

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## ABSTRACT

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

## KEYWORDS

i523

## 1 INTRODUCTION

The *proceedings* are the records of a conference. 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 [1].

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# Big Data Applications in Self-Driving Cars

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## KEYWORDS

ACM proceedings,  $\LaTeX$ , text tagging

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# Big Data in Oceanography

Zachary Meier

September 2017

## **1 Introduction**

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