

# Avaliação de Desempenho da Equação do Calor (Python vs Julia)

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Este trabalho tem como objetivo comparar o desempenho das linguagens de programação Python e Julia na resolução de equações do calor em 1, 2 e 3 dimensões. Se atentando ao tempo percorrido na execução dos programas, assim como a memória utilizada pelos mesmos, a fim de determinar qual das duas é a mais eficiente para esta aplicação específica. Este trabalho é feito com o intuito de ser um estudo em cálculo computacional e análise de desempenho.

CCS Concepts: • **General and reference** → **Measurement; Empirical studies.**

Additional Key Words and Phrases: Equação da Difusão do Calor, Análise de Desempenho, Python, Julia

## ACM Reference Format:

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## 1 Introdução

ACM’s consolidated article template, introduced in 2017, provides a consistent  $\LaTeX$  style for use across ACM publications, and incorporates accessibility and metadata-extraction functionality necessary for future Digital Library endeavors. Numerous ACM and SIG-specific  $\LaTeX$  templates have been examined, and their unique features incorporated into this single new template.

If you are new to publishing with ACM, this document is a valuable guide to the process of preparing your work for publication. If you have published with ACM before, this document provides insight and instruction into more recent changes to the article template.

The “acmart” document class can be used to prepare articles for any ACM publication — conference or journal, and for any stage of publication, from review to final “camera-ready” copy, to the author’s own version, with very few changes to the source.

## 2 Descrições Detalhadas

As noted in the introduction, the “acmart” document class can be used to prepare many different kinds of documentation — a double-anonymous initial submission of a full-length technical paper, a two-page SIGGRAPH Emerging Technologies

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abstract, a “camera-ready” journal article, a SIGCHI Extended Abstract, and more — all by selecting the appropriate *template style* and *template parameters*.

This document will explain the major features of the document class. For further information, the *L<sup>A</sup>T<sub>E</sub>X User’s Guide* is available from <https://www.acm.org/publications/proceedings-template>.

## 2.1 Ambiente

The primary parameter given to the “acmart” document class is the *template style* which corresponds to the kind of publication or SIG publishing the work. This parameter is enclosed in square brackets and is a part of the `documentclass` command:

```
\documentclass[STYLE]{acmart}
```

Journals use one of three template styles. All but three ACM journals use the `acsmall` template style:

- `acsmall`: The default journal template style.
- `acmlarge`: Used by JOCCH and TAP.
- `acmtog`: Used by TOG.

The majority of conference proceedings documentation will use the `acmconf` template style.

- `sigconf`: The default proceedings template style.
- `sigchi`: Used for SIGCHI conference articles.
- `sigplan`: Used for SIGPLAN conference articles.

## 2.2 Ferramentas

In addition to specifying the *template style* to be used in formatting your work, there are a number of *template parameters* which modify some part of the applied template style. A complete list of these parameters can be found in the *L<sup>A</sup>T<sub>E</sub>X User’s Guide*.

Frequently-used parameters, or combinations of parameters, include:

- `anonymous,review`: Suitable for a “double-anonymous” conference submission. Anonymizes the work and includes line numbers. Use with the `\acmSubmissionID` command to print the submission’s unique ID on each page of the work.
- `authorversion`: Produces a version of the work suitable for posting by the author.
- `screen`: Produces colored hyperlinks.

This document uses the following string as the first command in the source file:

```
\documentclass[acsmall]{acmart}
```

## 2.3 Métodos

### 3 Resultados Finais

Modifying the template — including but not limited to: adjusting margins, typeface sizes, line spacing, paragraph and list definitions, and the use of the `\vspace` command to manually adjust the vertical spacing between elements of your work — is not allowed.

**Your document will be returned to you for revision if modifications are discovered.**

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#### 4 Discussão

The “acmart” document class requires the use of the “Libertine” typeface family. Your  $\text{\TeX}$  installation should include this set of packages. Please do not substitute other typefaces. The “lmodern” and “ltimes” packages should not be used, as they will override the built-in typeface families.

#### 5 Conclusão e Recomendações para Melhoria no Desempenho

The title of your work should use capital letters appropriately - <https://capitalizemytitle.com/> has useful rules for capitalization. Use the `title` command to define the title of your work. If your work has a subtitle, define it with the `subtitle` command. Do not insert line breaks in your title.

If your title is lengthy, you must define a short version to be used in the page headers, to prevent overlapping text. The `title` command has a “short title” parameter:

```
\title[short title]{full title}
```

#### 6 Figures

The “figure” environment should be used for figures. One or more images can be placed within a figure. If your figure contains third-party material, you must clearly identify it as such, as shown in the example below.

Fig. 1. 1907 Franklin Model D roadster. Photograph by Harris & Ewing, Inc. [Public domain], via Wikimedia Commons. (<https://goo.gl/VLCRBB>).

Your figures should contain a caption which describes the figure to the reader.

Figure captions are placed *below* the figure.

Every figure should also have a figure description unless it is purely decorative. These descriptions convey what’s in the image to someone who cannot see it. They are also used by search engine crawlers for indexing images, and when images cannot be loaded.

A figure description must be unformatted plain text less than 2000 characters long (including spaces). **Figure descriptions should not repeat the figure caption – their purpose is to capture important information that is not already provided in the caption or the main text of the paper.** For figures that convey important and complex new information, a short text description may not be adequate. More complex alternative descriptions can be placed in an appendix and referenced in a short figure description. For example, provide a data table capturing the information in a bar chart, or a structured list representing a graph. For additional information regarding how best to write figure descriptions and why doing this is so important, please see <https://www.acm.org/publications/taps/describing-figures/>.

##### 6.1 The “Teaser Figure”

A “teaser figure” is an image, or set of images in one figure, that are placed after all author and affiliation information, and before the body of the article, spanning the page. If you wish to have such a figure in your article, place the command immediately before the `\maketitle` command:

```
\begin{teaserfigure}
  \includegraphics[width=\textwidth]{sampleteaser}
  \caption{figure caption}
```

```
\Description{figure description}
\end{teaserfigure}
```

## 7 Citations and Bibliographies

The use of Bib $\TeX$  for the preparation and formatting of one’s references is strongly recommended. Authors’ names should be complete — use full first names (“Donald E. Knuth”) not initials (“D. E. Knuth”) — and the salient identifying features of a reference should be included: title, year, volume, number, pages, article DOI, etc.

The bibliography is included in your source document with these two commands, placed just before the `\end{document}` command:

```
\bibliographystyle{ACM-Reference-Format}
\bibliography{bibfile}
```

where “bibfile” is the name, without the “.bib” suffix, of the Bib $\TeX$  file.

Citations and references are numbered by default. A small number of ACM publications have citations and references formatted in the “author year” style; for these exceptions, please include this command in the **preamble** (before the command “`\begin{document}`”) of your  $\LaTeX$  source:

```
\citestyle{acmauthoryear}
```

Some examples. A paginated journal article [2], an enumerated journal article [11], a reference to an entire issue [10], a monograph (whole book) [23], 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 [31], a chapter in a divisible book in a series [12], a multi-volume work as book [22], a couple of articles in a proceedings (of a conference, symposium, workshop for example) (paginated proceedings article) [3, 16], a proceedings article with all possible elements [30], an example of an enumerated proceedings article [15], an informally published work [17], a couple of preprints [6, 8], a doctoral dissertation [9], a master’s thesis: [4], an online document / world wide web resource [1, 25, 32], a video game (Case 1) [24] and (Case 2) and (Case 3) a patent [29], work accepted for publication, ‘YYYYb’-test for prolific author [27] and [28]. Other cites might contain ‘duplicate’ DOI and URLs (some SIAM articles) [21]. Boris / Barbara Beeton: multi-volume works as books [20] and [19]. A presentation . An article under review [7]. A couple of citations with DOIs: Online citations: [32–34]. Artifacts: [26] and [5].

## 8 Acknowledgments

Identification of funding sources and other support, and thanks to individuals and groups that assisted in the research and the preparation of the work should be included in an acknowledgment section, which is placed just before the reference section in your document.

This section has a special environment:

```
\begin{acks}
...
\end{acks}
```

so that the information contained therein can be more easily collected during the article metadata extraction phase, and to ensure consistency in the spelling of the section heading.

Authors should not prepare this section as a numbered or unnumbered \section; please use the “acks” environment.

## 9 Appendices

If your work needs an appendix, add it before the “\end{document}” command at the conclusion of your source document.

Start the appendix with the “appendix” command:

```
\appendix
```

and note that in the appendix, sections are lettered, not numbered. This document has two appendices, demonstrating the section and subsection identification method.

## 10 Multi-language papers

Papers may be written in languages other than English or include titles, subtitles, keywords and abstracts in different languages (as a rule, a paper in a language other than English should include an English title and an English abstract). Use `language=...` for every language used in the paper. The last language indicated is the main language of the paper. For example, a French paper with additional titles and abstracts in English and German may start with the following command

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

The title, subtitle, keywords and abstract will be typeset in the main language of the paper. The commands `\translatedXXX`, `XXX` begin title, subtitle and keywords, can be used to set these elements in the other languages. The environment `translatedabstract` is used to set the translation of the abstract. These commands and environment have a mandatory first argument: the language of the second argument. See `sample-sigconf-i13n.tex` file for examples of their usage.

## 11 SIGCHI Extended Abstracts

The “sigchi-a” template style (available only in  $\LaTeX$  and not in Word) produces a landscape-orientation formatted article, with a wide left margin. Three environments are available for use with the “sigchi-a” template style, and produce formatted output in the margin:

**sidebar:** Place formatted text in the margin.

**marginfigure:** Place a figure in the margin.

**marginfigure:** Place a table in the margin.

## Acknowledgments

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## A Research Methods

### A.1 Part One

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### A.2 Part Two

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## B Online Resources

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Nam interdum magna at lectus dignissim, ac dignissim lorem rhoncus. Maecenas eu arcu ac neque placerat aliquam. Nunc pulvinar massa et mattis lacinia.

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