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

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Write abstract

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

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

1 Introdução

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.

2 Descrições Detalhadas

2.1 Ambiente

Os experimentos foram executados em uma única máquina com um processador Intel Core I3 de 12ª geração, 8GB de memória, isolando o processo em um único núcleo usando *-cpuset-cpus="0"*, utilizando o *Frequency Governor* no modo performance para evitar oscilação do clock, *Turbo Boost* desativado, executando os códigos em um Docker para garantir a reprodutibilidade da pilha de software e dando partida a partir de um *Script Makefile* que orquestra todo o fluxo de testes.

2.2 Ferramentas

Foram utilizados códigos nas linguagens *Python, Julia, R, Bash e LaTeX* no projeto. O projeto também conta com *Makefile, Dockerfile e Jupyter Notebooks.*

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2.3 Métodos

Cada dimensão possuí um código em *Python* e em *Julia* que é executado com 3 tamanhos de carga, nomeadas *low, mid e high*. Um script *R* sorteia uma ordem para que os códigos de cada dimensão em cada linguagem sejam executados com cada uma das cargas. A saída dessas execuções são arquivos *csv* separados em duas pastas *results e performance*. Todos os resultados são tratados por outros script *R*, os primeiros geram os gráficos de tempo de execução, os últimos resultam nos gráficos de uso de memória.

3 Resultados Finais

4 Discussão

5 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).

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7 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.

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\appendix

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

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A Research Methods

A.1 Part One

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B Online Resources

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