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kifmm-rs: A Kernel-Independent Fast Multipole Method in Rust

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Software

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Summary

The Kernel Independent Fast Multipole Method (kiFMM) is ...

Statement of need

`kifmm-rs` is an

- Rust package build for speed and flexibility
- API designed to be user friendly, and easy to bind
- Simple trait based design, allow for separation of concerns and interface
- Can
  - evaluate potentials, potential gradients, for a range of compatible kernels
  - heterogenous support for critical operations
  - multi-platform deployment with Rust
  - state of the art performance on a single node.
  - design flexible, can easily extend to multi-node problems in a future release.

Combination of - speed + design + extensibility to new functionality (related algorithms) -

Mathematics

Single dollars ($) are required for inline mathematics e.g. $f(x) = e^{\pi/x}$

Double dollars make self-standing equations:

$$\Theta(x) = \begin{cases} 0 \text{ if } x < 0 \\ 1 \text{ else} \end{cases}$$

You can also use plain LaTeXfor equations

$$\hat{f}(\omega) = \int_{-\infty}^{\infty} f(x) e^{i\omega x} dx \tag{1}$$

and refer to Equation 1 from text.

Citations

Citations to entries in paper.bib should be in rMarkdown format.

If you want to cite a software repository URL (e.g. something on GitHub without a preferred citation) then you can do it with the example BibTeX entry below for Smith et al. (2020).

For a quick reference, the following citation commands can be used: - `@author:2001` -> "Author et al. (2001)" - `[@author:2001]` -> "(Author et al., 2001)" - `[@author1:2001; @author2:2001]` -> "(Author1 et al., 2001; Author2 et al., 2002)"

Figures

and referenced from text using **??**.

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References

Smith, A. M., Thaney, K., & Hahnel, M. (2020). Fidgit: An ungodly union of GitHub and figshare. In *GitHub repository*. GitHub. https://github.com/arfon/fidgit