

¹ cosmo-numba: B-modes and COSEBIs computations accelerated by Numba

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⁶ Summary

⁷ Cosmic shear important probe. B-modes computation as null test

⁸ Statement of need

⁹ Cosmo-numba facilitate the computation of E/B-modes decomposition using two methods. One
¹⁰ of them is COSEBIs as presented in ([P. Schneider et al., 2010](#)). COSEBIs relies on very
¹¹ high precision computation requiring more than 80 decimal numbers. ([P. Schneider et al.,
2010](#)) propose an implementation using mathematica. cosmo-numba make use of combination
¹³ of sympy and mpmath to reach the required precision. This python version enable an easier
¹⁴ integration in cosmology pipeline and facilitate the null tests.

¹⁵ The second decomposition has been presented in ([Peter Schneider et al., 2022](#)).

Mathematics

¹⁷ Single dollars (\$) are required for inline mathematics e.g. $f(x) = e^{\pi/x}$

¹⁸ Double dollars make self-standing equations:

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

¹⁹ You can also use plain L^AT_EX for equations

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

²⁰ and refer to [Equation 1](#) from text.

²¹ Citations

²² Citations to entries in paper.bib should be in [rMarkdown](#) format.

²³ If you want to cite a software repository URL (e.g. something on GitHub without a preferred
²⁴ citation) then you can do it with the example BibTeX entry below for (?).

²⁵ For a quick reference, the following citation commands can be used: - @author:2001 ->
²⁶ “Author et al. (2001)” - [@author:2001] -> “(Author et al., 2001)” - [@author1:2001;
²⁷ @author2:2001] -> “(Author1 et al., 2001; Author2 et al., 2002)”

²⁸ Figures

²⁹ Figures can be included like this: Caption for example figure. and referenced from text using
³⁰ [section](#).

³¹ Figure sizes can be customized by adding an optional second parameter: Caption for example
³² figure.

³³ Acknowledgements

³⁴ We acknowledge contributions from Brigitta Sipocz, Syrtis Major, and Semyeong Oh, and
³⁵ support from Kathryn Johnston during the genesis of this project.

³⁶ References

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³⁹ A. H. (2022). Pure-mode correlation functions for cosmic shear and application to KiDS-
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- ⁴² Schneider, P., Eifler, T., & Krause, E. (2010). COSEBIs: Extracting the full e-/b-mode
⁴³ information from cosmic shear correlation functions. *Astronomy and Astrophysics*, 520,
⁴⁴ A116. <https://doi.org/10.1051/0004-6361/201014235>