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FURAX: a modular JAX toolbox for solving inverse problems in science

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Modern scientific data analyses involve complex models, presenting significant challenges in both data volume and computation. We present FURAX (Framework for Unified and Robust data Analysis with JAX), an open-source Python library that provides building blocks to construct instrument and noise models in a modular fashion, that benefit from the cutting-edge optimisation and GPU utilisation from JAX. FURAX is applied to cosmological data analysis with the CMB data. The examples include maximum-likelihood map-making, gap-filling of a time-ordered series and incorporation of non-ideal instrumental components.

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