

ACCELERATED GRIFFIN-LIM ALGORITHM: A FAST AND PROVABLY CONVERGENT NUMERICAL METHOD FOR PHASE RETRIEVAL

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The recovery of a signal from the magnitudes of its transformation, like the Short Time Fourier transform, is known as the phase retrieval problem and it is of considerable relevance in various fields of engineering and applied physics. The Griffin-Lim algorithm (GLA) is a staple method commonly used for the phase retrieval problem, which is based on alternating projections. In 2013, Perraudin, Balazs and Søndergaard [1] introduced a momentum step based on Nesterov's Accelerated Gradient Method to enhance the convergence speed of GLA in numerical experiments, creating a new fast algorithm called the Fast Griffin-Lim algorithm (FGLA), which has since been widely used in the field. In our work, we design a further momentum and over-relaxation based modification of the Griffin-Lim Algorithm, which further enhances the performance, and we prove a convergence guarantee for the new algorithm and for FGLA, which up to this point remained an open question.

[1] Perraudin, Nathanaël & Balazs, Peter & Søndergaard, Peter. (2013). A Fast Griffin-Lim Algorithm. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics

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