

Compressive Inverse Scattering in Transformed Domains - Recent Advances

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Abstract

Compressive Sensing (CS) has recently emerged as one of the most powerful paradigms to develop robust and efficient inversion methodologies for microwave, radar, and optical imaging. The success of the CS techniques is actually motivated by their efficiency, robustness to noise, accuracy, and speed, as demonstrated in several applicative domains (see references below). However, the range of applicability of these approaches is currently limited to those scenarios in which the targets can be reliably represented by few isolated "pixels". Such a constraint is not actually a consequence of CS methods, but rather of the inversion domains which have been considered so far (usually based on traditional pixel discretizations).

In this presentation, a set of innovative procedures will be introduced to illustrate how and when the CS paradigm can be applied to more complex/arbitrary targets. Towards this end, its generalization to transformed domains will be described by considering either (a) different expansion bases for the unknowns, and

(b) different sparseness domains. Time permitting, a set of representative numerical examples will be also discussed to give some insights on the features, the potentialities, and the limitations of the proposed method also in comparison with state-of-the-art inversion techniques.

References

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