

Imaging a microonde mediante una tecnica di minimizzazione alternata basata su compressive sensing

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Abstract

Le tecniche di "Compressive Sampling" (CS), recentemente sviluppate nell'ambito dell'elaborazione digitale dei segnali, si occupano di permettere la ricostruzione affidabile di segnali (ad esempio, immagini) ad alta risoluzione con un numero di misure del fenomeno di interesse molto inferiore rispetto ai requisiti dati dal teorema del campionamento di Nyquist. Tali tecniche richiedono che (a) il problema sia lineare (b) le incognite siano rappresentabili mediante vettori "sparsi". Le tecniche di CS sono già state applicate con successo a numerosi problemi pratici in ambito radar, compressione delle immagini e della voce, e compressione video. Obiettivo del progetto è estendere l'utilizzo di tali tecniche ai problemi di imaging a microonde sfruttando la bi-linearità della formulazione CFI del problema. In particolare, l'attività si occuperà di sviluppare un codice per l'inversione a microonde basata sul Bayesian Compressive Sampling (BCS) in grado di risolvere in modo alternato la ricostruzione del contrasto (τ) e del campo totale (E_{tot}) incogniti, sfruttando opportunamente la bi-linearità del problema e, se necessario, l'utilizzo di funzioni base ad-hoc.

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