

Reconstruction of a Function from its Elliptical Radon Transform

Rim Gouia-Zarrad¹, Gaik Ambartsoumian²

¹ The American University of Sharjah
rgouia@aus.edu

² The University of Texas at Arlington
gambarts@uta.edu

Keywords: circular Radon transform, elliptical Radon transform, reconstruction, bistatic regime, backprojection algorithm

The talk discusses the fundamental question of image reconstruction in bistatic regime in which the measurements represent line integrals over a family of ellipses with foci at the source and receiver locations. An integral transform, the elliptical Radon transform is introduced and used to model the data. This talk presents some new numerical results about the inversion of the elliptical Radon in 2D. A new approximate inversion formula is presented in the case of circular acquisition geometry when the source and the receiver are rotating around the origin at a fixed distance from each other. We demonstrate the efficiency of the suggested algorithm by presenting a computational implementation of the method on a numerical phantom. This novel algorithm can be efficiently implemented as a numerical method in several bistatic imaging modalities e.g. in biomedical imaging.