

Injectivity and stability of inversion of the star transform

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Abstract: The star transform appears in mathematical models of single-scattering x-ray tomography and single scattering optical tomography. It is a generalized Radon-type operator mapping a function to a linear combination of its integrals along rays emanating from a common vertex inside the function's support. The directions of rays, as well as the coefficients of the linear combination, affect various aspects of the inversion of that operator. The talk will discuss the injectivity of the star transform, review a recently discovered exact closed-form inversion formula for that operator, and classify its configurations based on the stability of the inversion. We will also state some open problems on the subject and present results of numerical simulations.