

Image Reconstruction from Limited Angle Tomographic Data With a Priori Knowledge

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In Computed Tomography the goal is to recover an unknown density function f from its line integrals $\int_L f(x)dl(x)$. The classic inversion formula requires information of all the line integrals in order to do this at any point. And such requirement is a very inconvenient property from the point of view of applications. We will discuss a different approach that uses a formula relating the line integrals and a Hilbert transform of the function. This way it is possible to produce uniqueness results, some stability estimates, and even inversion formulas, in cases when not all the line integrals are available. This cases are therefore not covered by the classical inversion formula. But to compensate for the incomplete knowledge of line integrals, some a priori knowledge about the support of the function, or the value of the function in some region, is needed.

References

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