

On numerical instability of a singular integral equation in x-ray computerized tomography with partial measurement

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We consider x-ray tomography with limited data measured only on an arc of the boundary. A Cauchy-type boundary integral formula has been proposed by Bukhgeim (1995), and the jump relation applied to it derives a Cauchy-type singular integral equation. It is well known that its inversion is unstable in the L^2 sense even if it exists. This talk presents a quantitative estimate of instability under some discretization, and it shows that the instability is not severe. Some numerical examples are exhibited to support our analysis and to show feasibility of the proposed algorithms. We note that the proposed reconstruction procedure is neither statistical nor iterative.

References

- [1] . L. Bukhgeim, *Inversion formulas in inverse problems*, in Linear operators and ill-posed problems, Plenum, New York (1995) 323–378.
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