NUMERICAL REALIZATION OF A NEW GENERATION TOMOGRAPHY ALGORITHM BASED ON THE CAUCHY-TYPE INTEGRAL FORMULA

HIROSHI FUJIWARA
Graduate School of Informatics, Kyoto University
Yoshida-honmachi, Sakyo-ku, Kyoto, 606-8501, Japan
(E-mail: fujiwara@acs.i.kyoto-u.ac.jp)

and

ALEXANDRU TAMASAN
Department of Mathematics, University of Central Florida
Orlando, Florida, 32816, USA
(E-mail: tamasan@math.ucf.edu)

Abstract. This work concerns the numerical realization of a Cauchy-type integral formula for sequence valued analytic functions in the sense of Bukhgeim, and its applications to the source reconstruction problem in inverse radiative transport through a non-absorbing and non-scattering medium. The inverse source problem is mathematically equivalent to the classical X-ray Computed Tomography (CT), where a function is to be determined from its line integrals. The proposed algorithms have the added advantage to extend to the source determination problems in media with absorbing and scattering properties. Such extensions cannot be achieved in the existing X-ray CT algorithms. The numerical experiments demonstrate the feasibility of our new tomographic algorithms.