

IMAGE RECONSTRUCTION ALGORITHMS IN CONE BEAM TOMOGRAPHY FOR GENERAL CLASSES OF SOURCE TRAJECTORIES

Alexander Katsevich
Department of Mathematics
University of Central Florida
Orlando, FL 32816-1364

This is joint work with Michael Kapralov.

We report on two extensions of exact inversion formulas for the cone beam transform to more general classes of trajectories. The first class consists of curves that are smooth, have positive curvature and torsion, and have some other natural geometric properties. We generalize the notion of PI-lines, study their properties and formulate a reconstruction algorithm. The second class of trajectories consists of circle-plus curves, which have two components: C and L . The first component C , which is analogous to the circle in the traditional circle-plus trajectories, is essentially any closed (not necessarily planar) continuous curve. The second component L is almost any continuous curve. The only condition is that L starts below C and ends above C . The algorithm is especially convenient for the traditional circle-plus trajectories, which are implemented using a gantry and moving table. In this case we obtain a universal reconstruction algorithm, which is completely independent of how the table moves during the scan. The results of testing both algorithms demonstrate good image quality.