EFFICIENT CONE-BEAM RECONSTRUCTION SYSTEM USING CIRCLE-AND-LINE ORBIT DATA

ABSTRACT

A system is provided for reconstructing x-ray tomographic images based upon the circle-and-line orbit. The system includes the steps of combining, in the frequency domain, images reconstructed separately from the circular and linear orbit data. Specifically, the method involves the steps of (1) converting the shadow zone into a shadow cone in frequency domain, (2) mapping the shadow cone in 3D Fourier space onto a set of 2D Fourier planes, (3) removing data lying within the region marked as the projection of the shadow cone from the Fourier transform of the circular orbit data and patching the same from the Fourier transform of the line orbit data, (4) transforming each 2D Fourier plane into a respective 2D image plane, and (5) converting the horn-shaped volume back to a grid volume. An interpolation technique is also provided for reconstructing the line orbit data using a Direct Fourier method (DFM).

Figure 1