Singular value decomposition of the attenuated conical Radon transform with a fixed central axis and opening angle

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ABSTRACT

Several types of conical Radon transforms have been studied since the introduction of the Compton camera. Several factors of a cone of integration can be considered as variables, for example, a vertex, a central axis, and an opening angle. In this paper, we study the conical Radon transform with a fixed central axis and opening angle. Furthermore, we consider the attenuation effect in the conical Radon transform because it allows us to obtain a high-quality reconstruction image. We construct a nonseparable Hilbert space and its maximal orthonormal set. This maximal orthonormal set comprises the eigenfunctions of the attenuated conical Radon transform, i.e. singular value decomposition (SVD). Finally, the inversion formula of the attenuated conical Radon transform is deduced from the SVD.

REFERENCES