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Tomographic reconstruction from arbitrary directions

In this work the method of tomographic reconstruction, based on ridge functions and invented by Logan and Shepp, is considered. An approach to image reconstruction from a finite number of arbitrary directed projections within the framework of the conventional parallel beam geometry is suggested. The method deals with images that can be presented as a sum of ridge functions. This assumption results in a consistent linear system of the Fredholm integral equations of the first kind in terms of one–dimensional functions. As a consequence of the approach, a formula for the ridge functions calculation is obtained. In the particular case of equally spaced projections, formulae of analytical inversion of matrices encoutered in numerical reconstruction, are derived.