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Singular value decomposition for the truncated Hilbert transform.

Starting from a breakthrough result by Gelfand and Graev, inversion of the Hilbert transform became a very important tool for image reconstruction in tomography. In particular, their result is useful when the tomographic data are truncated and one deals with an interior problem. As was established recently, interior problem admits a stable and unique solution when some a priori information about the object being scanned is available. The most common approach to solving the interior problem is based on converting it to the Hilbert transform and performing analytic continuation. Depending on what type of tomographic data are available, one gets different Hilbert inversion problems. In this talk we consider several such problems and establish singular value decomposition for the operators involved. We also propose algorithms for performing analytic continuation. (Received January 10, 2011)