E.Y. Sidky and X. Pan, Image reconstruction in circular cone-beam computed tomography by constrained, total-variation minimization, *Physics in Medicine and Biology*, Vol. 53, pp. 4777-4807, (**2008**). DOI:10.1088/0031-9155/53/17/021.

Abstract

An iterative algorithm, based on recent work in compressive sensing, is developed for volume image reconstruction from a circular cone-beam scan. The algorithm minimizes the total variation (TV) of the image subject to the constraint that the estimated projection data is within a specified tolerance of the available data and that the values of the volume image are non-negative. The constraints are enforced by the use of projection onto convex sets (POCS) and the TV objective is minimized by steepest descent with an adaptive step-size. The algorithm is referred to as adaptive-steepest-descent-POCS (ASD-POCS). It appears to be robust against cone-beam artifacts, and may be particularly useful when the angular range is limited or when the angular sampling rate is low. The ASD-POCS algorithm is tested with the Defrise disk and jaw computerized phantoms. Some comparisons are performed with the POCS and expectation-maximization (EM) algorithms. Although the algorithm is presented in the context of circular cone-beam image reconstruction, it can also be applied to scanning geometries involving other x-ray source trajectories.