Jiehua Zhu*, Department of Mathematical Sciences, Georgia Southern University, Statesboro, GA 30458, and Xiezhang Li, Department of Mathematical Sciences, Georgia Southern University, Statesboro, GA 30458. A generalized $l_1$ greedy algorithm for image reconstruction in computed tomography.

The sparse vector solutions for an underdetermined system of linear equations $Ax = b$ have many applications in signal recovery and image reconstruction in tomography. Under certain conditions, the sparsest solution can be found by solving a constrained $l_1$ minimization problem: $\min ||x||_1$ subject to $Ax = b$. Recently, the reweighted $l_1$ minimization and $l_1$ greedy algorithm have been introduced to improve the convergence of the $l_1$ minimization problem. As an extension, a generalized $l_1$ greedy algorithm for computerized tomography (CT) is proposed in this paper. It is implemented as a generalized total variation minimization for images with sparse gradients in CT. A numerical experiment is also given to illustrate the advantage of the new algorithm. (Received September 26, 2012)