Adaptive BOSVS Algorithm for Regularized Convex Optimization Problems with Application to Medical Image Reconstruction

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Abstract

This paper proposes a new Adaptive Bregman operator splitting algorithm with variable stepsize (Adaptive BOSVS) for solving nonsmooth problems arising in magnatic resonance image reconstruction. The original BOSVS algorithm uses a line search to achieve efficiency, while a proximal parameter is adjusted to ensure global convergence whenever a monotonicity condition is violated. The new Adaptive BOSVS uses a simpler line search than that used by BOSVS, and the monotonicity test can be skipped. Numerical experiments based on partially parallel image reconstruction compare the performance of BOSVS and Adaptive BOSVS scheme.