

论文与报告

基于回溯的迭代硬阈值算法

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摘要

针对压缩传感(Compressed sensing, CS)理论中迭代硬阈值(Iterative hard thresholding, IHT)算法迭代次数多和时间长的问题, 提出基于回溯的迭代硬阈值算法(Backtracking-based iterative hard thresholding, BIHT), 该算法通过加入回溯的思想, 优化了IHT算法迭代支撑的选择, 减少支撑被反复选择的次数. 模拟实验表明, 在保证重建质量的前提下, 相比较于IHT和正规化迭代硬阈值(Normalized IHT, NIHT)算法, BIHT算法的重建时间降低了2个数量级. 用本身稀疏的0-1随机信号的重建实验表明, 若测量次数和稀疏度相同, BIHT算法的重建概率高于IHT算法.

关键词 [压缩传感](#) [迭代硬阈值](#) [正规化迭代硬阈值](#) [回溯](#) [稀疏](#)

分类号

Iterative Hard Thresholding Algorithm Based on Backtracking

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Abstract

The backtracking-based iterative hard thresholding (BIHT) algorithm is proposed to solve the problem that the number of iterations is too large and the iteration time is too long when the iterative hard thresholding (IHT) algorithm is applied to the compressive sensing. The BIHT algorithm optimizes the sub-optimal choice of supports for each iteration and reduces the times of some supports iterated repeatedly by adding the idea of backtracking. The simulation demonstrates that backtracking-based algorithm ensures the reconstruction quality and decreases the time by two orders of magnitude when compared with IHT and Normalized iterative hard thresholding (NHT) algorithms for low noise level. Simulation on the 0-1 sparse signal demonstrates that the reconstruction probability of BIHT algorithm is higher than that of the IHT algorithm if the measurement times and sparsity of the signal are the same.

Key words [Compressive sensing](#) [iterative hard thresholding \(IHT\)](#) [normalized iterative hard thresholding \(NIHT\)](#) [backtracking](#) [sparsity](#)

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