Proximal algorithm for compressive sensing

MEHRDAD LAKESTANI

University of Tabriz, Tabriz, Iran

email: lakestani@tabrizu.ac.ir

Proximal algorithm can be used for solving non-smooth, constrained and large-scale optimization problems [3]. Thus it can be used successfully for image processing purposes [1]. Let $A \in \mathbb{R}^{m\times n}$ with $m < n$ or $m \ll n$ (in compressed sensing), $b \in \mathbb{R}^m$, and $x \in \mathbb{R}^n$. A basis pursuit problem is a constrained minimization problem as follows:

$$\min_{x\in\mathbb{R}^n} \{||x||_1 : \quad Ax = b\}, \tag{1}$$

which gives the solution of the under determined linear system $Ax = b$ with minimal L_1 norm. In this paper we improve and use proximal gradient algorithm to solve basis pursuit and related sparse optimization problems [4, 2].

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