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# \$I\_{2,p}\$ Matrix Norm and Its Application in Feature Selection

## Liping Wang, Songcan Chen

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Recently,  $l_{2,1}$  matrix norm has been widely applied to many areas such as computer vision, pattern recognition, biological study and etc. As an extension of  $l_1$  vector norm, the mixed  $l_{2,1}$  matrix norm is often used to find jointly sparse solutions. Moreover, an efficient iterative algorithm has been designed to solve  $l_{2,1}$ -norm involved minimizations. Actually, computational studies have showed that  $l_p$ -regularization (0 ) is $sparser than <math>l_1$ -regularization, but the extension to matrix norm has been seldom considered. This paper presents a definition of mixed  $l_{2,p}$  (p < 1) (0, 1]) matrix pseudo norm which is thought as both generalizations of  $l_p$ vector norm to matrix and  $l_{2,1}$ -norm to nonconvex cases (0 . $Fortunately, an efficient unified algorithm is proposed to solve the induced <math>l_{2,p}$ -norm (p < 1) optimization problems. The convergence can also be uniformly demonstrated for all p < 1. Typical p < 1 (0, 1] are applied to select features in computational biology and the experimental results show that some choices of 0 do improve the sparse pattern of using <math>p = 1.

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