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Sofya Chepushtanova* (chepusht@math.colostate.edu), 101 Weber Building Colorado State University, Fort Collins, CO 80523-1874, and **Michael Kirby**. *Hyperspectral Band Selection Using Sparse Support Vector Machines*.

In this research we explore an ℓ_1 -norm linear support vector machine (ℓ_1 -norm SVM) for the hyperspectral imagery band selection problem. The ℓ_1 -norm SVM constructs the optimal separating hyperplane between two classes of data points with maximum margin measured in ℓ_∞ -norm. The resulting optimization problem is in the form of a linear program which we solve using a primal dual interior point algorithm. The ℓ_1 -norm suppresses many components of the weight vector w , normal to the hyperplane, and the nonzero components in w indicate the spectral bands that are effective at separating the data. We propose a statistical framework for the band selection problem. Using the ℓ_1 -norm SVMs built on randomly chosen subsets of training data, we derive a sample of sparse weight vectors w . Then hypothesis testing is used to select and order the important bands by P -values. The behavior of the learning method is illustrated by modeling decision functions for classification of the AVIRIS Indian Pines data set. The models are tested on the full and reduced testing sets with high accuracy rates achieved on both. (Received September 24, 2012)