1037-41-105   **Akram Aldroubi** (`akram.aldroubi@vanderbilt.edu`), Department of Mathematics, Vanderbilt Unoversity, Nashville, TN 37240, and **Kourosh Zarringhalam*** (`kourosh.zarringhalam@vanderbilt.edu`), 1414 Stevenson Center, Department of Mathematics, Vanderbilt University, Nashville, TN 37240. *Optimal Nonlinear Models for Sparsity and Image Segmentation.*

We present an optimal nonlinear model for approximating a given set of signals. The model consists of a union of shift invariant spaces that are "optimally" compatible with the observed data in the sense that the square of the distances between each signal and its closest subspace is minimized. An iterative algorithm that iterates between the subspaces and partitions of data point to find the solution subspaces is proposed. The algorithm depends on the choice of initial partition. We provided different initializing algorithms and applied the results to image segmentation. (Received January 26, 2008)