1068-65-254 **Simon Foucart*** (foucart@math.drexel.edu), 269 Korman Center, Department of Mathematics, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104. *Hard Thresholding Pursuit for Sparse Reconstruction.*

We introduce a new iterative algorithm to find s-sparse solutions $\mathbf{x} \in \mathbb{C}^N$ of underdetermined linear systems $A\mathbf{z} = \mathbf{y}$, $A \in \mathbb{C}^{m \times N}$, $\mathbf{y} \in \mathbb{C}^m$. The algorithm, which is a simple combination of existing Compressive Sensing algorithms, is called Hard Thresholding Pursuit. We study its convergence to notice that only a finite number of iterations are required. We then give a short and elegant proof of the fact that, under a certain restricted isometry condition on the matrix A, every s-sparse vector is exactly recovered as the output of the algorithm with uncorrupted input $\mathbf{y} = A\mathbf{x} \in \mathbb{C}^m$. The condition, namely that $3s$th order restricted isometry constant satisfies $\delta_{3s} < 1/\sqrt{3}$, is heuristically better than the sufficient conditions currently available for other Compressive Sensing algorithms. Next, we extend the result to non-sparse vectors and to corrupted inputs. We conclude by discussing some variations of the algorithms. (Received January 19, 2011)