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Xiangxiong Zhang* (zhangxx@math.mit.edu), Math Dept., MIT, Cambridge, MA 02139.

Eventual linear convergence of the Douglas-Rachford iteration for basis pursuit.

We provide a simple analysis of the Douglas-Rachford splitting algorithm in the context of ℓ^1 minimization with linear constraints, and quantify the asymptotic linear convergence rate in terms of principal angles between relevant vector spaces. In the compressed sensing setting, we show how to bound this rate in terms of the restricted isometry constant. More general iterative schemes obtained by ℓ^2 -regularization and over-relaxation including the dual split Bregman method are also treated, which answers the question how to choose the relaxation and soft-thresholding parameters to accelerate the asymptotic convergence rate. We make no attempt at characterizing the transient regime preceding the onset of linear convergence. (Received September 14, 2013)