Meeting: 1003, Atlanta, Georgia, SS 17A, AMS-SIAM Special Session on Nonsmooth Analysis in Variational and Imaging Problems, I

1003-49-1107 **Michael Hintermueller*** (michael.hintermueller@uni-graz.at), University of Graz, Dept. of Mathematics, Heinrichstr. 36, A-8045 Graz, Austria. *Total Bounded Variation Regularization as a Bilaterally Constrained Optimization Problem.*

It is demonstrated that the predual for problems with total bounded variation regularization terms can be expressed as a bilaterally constrained optimization problem. Existence of a Lagrange multiplier and an optimality system are established. This allows us to utilize efficient optimization methods developed for problems with box constraints in the context of bounded variation formulations. Here, in particular, the primal-dual active set method, considered as a semismooth Newton method, is analyzed, and superlinear convergence is proved. As a by-product we obtain that the Lagrange multiplier associated with the box constraints acts as an edge detector. Numerical results for image denoising and zooming/resizing show the efficiency of the new approach. (Received October 04, 2004)