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Maryam Yashtini* (myashtini3@math.gatech.edu), School of Mathematics, Georgia Tech, 686 Cherry St NW, Atlanta, GA 30332. *Fast Alternating Minimization Methods for Convex and Non-convex Inverse Problems and Applications*. Preliminary report.

In the first part, I will introduce a fast alternating direction approximate Newton method for solving total variation regularized inverse problems. The proposed algorithm is designed to handle applications where the matrix in the fidelity term is a large dense, ill conditioned. Numerical results are provided using test problems from parallel magnetic resonance imaging. In the second part, I will focus on the Euler's Elastica-based inpainting model. The associated Euler-Lagrange equation of this model is fourth order hence minimization of energy functional becomes very complex. I will introduce new methods to solve this problem much more efficiently. Comparisons are made with some state of art algorithms on image inpainting. (Received November 01, 2015)