1067-00-1440 **Antoine V Elabdouni*** (antoine_elabdouni@berkeley.edu). *Linear and Nonlinear Inverse Problems.* Preliminary report.

We consider both Linear and Nonlinear Inverse Problems, in which we must reconstruct a parameter from an observed data set. The linear problem is that of reconstructing a clear image, given a blurred (convoluted) version of it. Different methods are explored for solving linear rank-deficient systems (as is the case in this example), namely Krylov Iteration and Tikhonov Regularization with which we eventually "solve" the problem. The nonlinear problem is that of reconstructing the heat conductivity of a cooling fin, modeled by a 2-dimensional steady-state equation with Robin boundary conditions. The Metropolis Hastings Markov Chain Monte Carlo algorithm is studied and implemented, as well as the notion of priors. Different methods for generating the next guess in the algorithm are developed and the results of these methods discussed.
This work was supported in part by the National Science Foundation REU and Department of Defense ASSURE Program held at George Mason University (Summer 2010). (Received September 21, 2010)