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**Cara D. Brooks\*** (cbrooks@fgcu.edu). *Local Regularization Methods for Solving Inverse Problems*. Preliminary report.

Solutions of linear and nonlinear inverse problems, particularly those with special structure or for which non-smooth solutions are expected, can be effectively reconstructed using *local regularization* methods. Key features of these methods are the utilization of data most relevant to the desired solution and the non-global manner in which regularization is applied. For Volterra problems, these methods retain the causal structure of the original problem (in contrast to classical regularization methods) and lead to fast sequential numerical algorithms to solve the inverse problem. In this talk, we present advancements in the theoretical development of local regularization methods, convergence results for solving classes of linear and nonlinear Volterra inverse problems, and strategies to select the (local) regularization parameter so that convergence is achieved. (Received January 18, 2012)