1133-49-187 **Akhtar A. Khan*** (aaksma@rit.edu), Center for Applied and Computational Mathemat, School of Mathematical Sciences, Rochester Institute of Technology, Rochester, NY 14623. *Contingent Derivatives and Elliptic Regularization for Noncoercive Elliptic Inverse Problems Under Data Perturbation.* Preliminary report.

In this talk, we discuss the inverse problem of parameter identification in non-coercive variational problems which appear commonly in applied models. We examine the differentiability of the set-valued parameter-to-solution map by using first-order and second-order contingent derivatives. We explore the inverse problem by posing optimization problems using the output least-squares and the modified output least-squares. By regularizing the non-coercive variational problem, we obtain a single-valued parameter-to-selection map and investigate it smoothness and boundedness. We consider optimization problems using the output least-squares and the modified output least-squares for the regularized variational problem. We provide a complete convergence analysis showing that the regularized problems approximate the original problem suitably. We also give first-order, and second-order adjoint method for the computation of the first-order and second-order derivatives of the output least-squares objective. We provide a discretization scheme and give discrete formulas for the gradient and Hessian calculation. (Received July 25, 2017)