Sensitivity to Observations in Model-Constrained Optimization

D.N. Daescu

Department of Mathematics and Statistics, Portland State University daescu@pdx.edu

Abstract

The sensitivity of the least-squares state estimation to observational data is considered in the context of nonlinear model-constrained optimization. The sensitivity equations are derived from the first order optimality conditions and a second order adjoint model is used to provide Hessian matrix information. Practical implementation for large-scale systems and order reduction are discussed. Numerical results and sensitivity to time-space distributed data are presented with a two-dimensional shallow-water model.