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Robert E White* (white@math.ncsu.edu), SAS 3140, Department of Mathematics, North Carolina State University, Raleigh, NC 27695-8205. *Hazard Identification: Sensitivity and Optimal Location of Sensors*. Preliminary report.

Consider a hazard whose concentration is governed by a partial differential equation and a finite number of “point” sources. The discrete model is considered with more sensors than sources. The objective is to locate and determine the intensities of the sources from data collected at the sensors. This leads to a nonnegative nonlinear least squares problem, which may be ill-conditioned. The location of the sensors and the physical data such as velocity and mass diffusion give perturbations of the matrix and vector in the right side. These perturbations can give rise to ill-conditioned problems; that is, variations in the sensor locations and physical data may induce significant errors in the solution of the nonnegative nonlinear least squares problem. Numerical studies and a variation of condition number of the matrix will be presented. (Received September 14, 2010)