

1106-G1-2660

**J D Fortin\*** (dfortin@jwu.edu), J. D. Fortin, 801 West Trade St., Johnson & Wales University, Charlotte, NC 28202. *How Do Badly Conditioned Systems Misbehave?*

Badly conditioned linear systems are characterized by large condition numbers and by the fact that small changes in the coefficients (e.g., rounding) can result in significant changes to the solution. What is the tie-in between condition number and sensitivity to changes? The objective is an explanation that ties in closely with the process of solving linear equations and that students can understand.

A badly conditioned system is introduced, and technology (e.g., Matlab) is applied for the singular value decomposition. The linear system is uncoupled via the singular vectors, and technology is employed to assess sensitivity to small perturbations of the uncoupled system. Results of systematic perturbations are given. The uncoupled system allows easy computational and algebraic solutions. The latter are employed to explain large and small responses to small perturbations in terms of the singular values and to highlight the role of the singular vectors as directions of change. (Received September 16, 2014)