

MINIMIZATION OF FUNCTIONALS ON THE SOLUTION OF A LARGE-SCALE ILL-POSED PROBLEM

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In this work we study the minimization of a linear functional defined on a set of approximate solutions of a discrete ill-posed problem. The primary application is computation of confidence intervals for components of the true solution. We exploit the technique introduced by Elden in 1990 ([1]), based on a parametric programming reformulation involving the solution of a sequence of quadratically constrained least squares problems. To minimize the number of matrix-vector products, we apply a numerical method based on Lanczos bidiagonalization and Gauss-type quadrature rules to solve the trust-region subproblems.

References

- [1] Elden L., *Algorithm for the computation of functionals defined on the solution of discrete ill-posed problems*, BIT, 30 (1990), pp. 466–483.