

## **Povzetek**

Diplomsko delo opisuje reševanje dveh sorodnih problemov, kvadratno vezanega problema najmanjših kvadratov ter kvadratno vezane kvadratne forme. Oba problema srečamo pri regularizaciji. V delu so podani pogoji za obstoj rešitev, algoritmi za reševanje problemov, ter metode za reševanje, implementirane v Matlabu.

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**Ključne besede:** kvadratno vezan problem najmanjših kvadratov, kvadratno vezana kvadratna forma, regularizacija

**Keywords:** quadratically constrained least squares problem, quadratically constrained quadratic problem, regularization

# Literatura

- [1] M.R. Abdel-Aziz, M.M. El-Alem (2003): *Solving Large-Scale Constrained Least-Squares Problems*, Appl. Math. Comput. 137, 571–587.
- [2] A. Björck (1996): *Numerical methods for least squares problems*, SIAM, Philadelphia.
- [3] J.W. Demmel (2000): *Uporabna numerična linearna algebra*, DMFA, Ljubljana.
- [4] L. Eldén (1977): *Algorithms for The Regularization of Ill-Conditioned Least Squares Problems*, BIT 17, 134–145.
- [5] L. Eldén (2002): *Solving Quadratically Constrained Least Squares Problems Using a Differential-Geometric Approach*, BIT 42, 323–335.
- [6] W. Gander (1981): *Least squares with a quadratic constraint*, Numer. Math. 36, 291–307.
- [7] W. Gander, G.H. Golub, U. von Matt (1989): *A Constrained Eigenvalue Problem*, Linear Algebra Appl. 114/115, 815–839.
- [8] G.H. Golub, C.F. van Loan (1986): *Matrix computations*, North Oxford Academic, London.
- [9] G.H. Golub, U. von Matt (1991): *Quadratically constrained least squares and quadratic problems*, Numer. Math. 59, 561–580.
- [10] W.W. Hager (2001): *Minimizing a Quadratic Over a Sphere*, SIAM J. Optim. 12, 188–208.
- [11] P.C. Hansen (1994): *Regularization Tools*, Numerical Algorithms 6, 1–35.
- [12] V.I. Krylov (1962): *Approximate Calculation of Integrals*, Macmillian, New York.
- [13] C.L. Lawson, R.J. Hanson (1995): *Solving least squares problems*, SIAM, Philadelphia.
- [14] A. Melman (1995): *Numerical solution of a secular equation*, Numer. Math. 69, 483–493.
- [15] M. Rojas, D.C. Sorensen (2002): *A Trust-Region Approach to the Regularization of Large-Scale Discrete Ill-Posed Problems*, SIAM J. Sci. Comput. 23, 1842–1860.