

# Multiple parameter regularization: Numerical solutions and applications to the determination of geopotential

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We will investigate practical effectiveness of multiple parameter regularization for solving inverse ill-posed problems. We will first briefly review regularization methods used for the determination of the external gravitational field from space geodetic tracking, including Kaula's rule of thumb and its modified versions. We will then present the multiple parameter regularization method proposed by Xu and Rummel (1992, 1994). Optimization algorithms will be coded to find the optimal regularization parameters. In particular, since the objective function is nonlinear but seems to have a good topological property, we will use a quasi-Newton's optimization method, since it is theoretically sufficiently fast and does not require the information on the second order derivatives of the objective function.

Finally, we will describe our experiments and discuss the results.