



Application of kernel ridge regression to network levelling via *Mathematica*

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Levelling is an important process in geosciences. In this paper we suggest a new algorithm for linear adjustment, which minimizes not only the residuum, but also provides a robust solution for the levelling problem.

This kind of solution represents a trade – off between the minimization of the residuum and that of the sensitivity of the solution concerning measurement error and noise.

The method based on the Kernel Ridge Regression (KRR) deduced from the Support Vector Machine theory and specialized for adjustment. The minimization of the double objective can be controlled by regularization parameter of the KRR. The robustness of this method can be measured by subspace information criterion (SIC) indicating that small measurement noise does not seem to have serious effect on the accuracy.

The presented method is illustrated by a real size network levelling problem, and the effect of the noise is taken into consideration via stochastic simulation. The results are compared with that of the traditional pseudoinverse solution. The computation and visualization are carried out with *Mathematica* 5.1