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Application of variance component estimation method for strain analysis directly from repeated geodetic observations

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One of the main problems in geodetic computations using heterogeneous observables is estimation of suitable relative weights of the observations. This is also the case in the method recently proposed by the authors for strain analysis directly from repeated geodetic observations. Using following Variance Covariance Components (VCC) estimation methods: (i) Helmert Estimator, (ii) MInimum Norm Quadratic Unbiased Estimator (MINQUE) and (iii) Best Quadratic Unbiased Non-negative Estimator (BQUNE) the relative weights of the different geodetic observations are estimated and used in our method for strain analysis directly from the repeated geodetic observations. According the numerical tests of the study, MINQUE Variance Covariance Component estimation method is recommended for this specific application. The theoretical details of the methods and numerical results from simulation studies and real case studies are presented in the paper.