Experiments on Coordinate Transformation based on Least Squares and Total Least Squares Methods

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Coordinate transformation is an important problem in geodesy discipline. Variations in stochastic and functional models in transformation problem cause different estimation results. Least-squares (LS) method is generally implemented to solve this problem. LS method accepts only one epoch coordinate data group erroneous in stochastic model. However, all the data in transformation problem are erroneous. In contrast to the traditional LS method, the Total Least Squares (TLS) method takes into account the errors in all the variables in the transformation. It is so-called errors-invariables (EIV) model. In the last decades, TLS method has been implemented to solve transformation problem. In this context, it is important to determine which method is more accurate. In this study, LS and TLS methods have been implemented on different 2D and 3D geodetic networks with different simulation scenarios. The first results show that the translation parameters are affected more than rotation and scale parameters. Although TLS method considers the errors for two coordinate the estimated parameters for both methods are different from simulated values.