Reliability of the Conventional Deformation Analysis Methods for Vertical Networks

Serif HEKIMOGLU, Hüseyin DEMIREL and Cüneyt AYDIN, Turkey

Key words: Deformation analysis, vertical deformation, reliability, homoscedasticity heteroscedasticity.

ABSTRACT

Reliability of the conventional deformation analysis methods is defined with mean success rate. The mean success rate is given as the number of successes divided by the number of experiments. Four different vertical networks are generated by simulation. The observations for two epochs and deformations are also generated. The mean success rates of the methods are computed for certain number of deformed points, for a given interval and for kinds of deformation. Consequently, the reliability of the methods changes depending on number of points, magnitude of deformations, degrees of freedom and number of deformed points. The reliability of the methods increases when the degrees of freedom and the magnitudes of deformations increase. It decreases when the number of points and the number of deformed points increase. As known, the random errors' variances are changing depending on the distance of the levelling lines. This Gauss-Markov model is called as heteroscedastic. If the distances are approximately equal to each other, the random errors have a common variance. So, the model is called as homoscedastic. If the model is homoscedastic, the reliability of the analysis methods increases very rapidly with respect to the ones of the heteroscedastic model.

CONTACT

Serif Hekimoglu, Hüseyin Demirel and Cüneyt Aydin
Yildiz Technical University
Department of Geodesy and Photogrammetry Engineering
80750 Istanbul
TURKEY
Tel. + 90 212 259 70 70
Fax + 90 212 261 07 67
E-mail: hekim@yildiz.edu.tr , hdemirel@yildiz.edu.tr and caydin@yildiz.edu.tr