DEFORMATION ANALYSIS WITH CONFIDENCE ELLIPSES IN GEREDE NETWORK

T. Ayan, M. Onur Kaplan
(ITU,Civil Engineering Faculty, Geodesy Division, Istanbul – TURKEY)

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ABSTRACT

Determination and the interpretation of the deformations by geodetic measurements are called as deformation analysis. These geodetic measurements, so-called deformation measurements might be carried out for the detection of the deformations in any construction and in its surrounding area, taking place as a result of loading or for the determination of crustal movements and landslides on the earth.

In the deformation studies, geodetic observations are repeated at different epochs of time. The observations of each epoch are adjusted independently. From coordinate differences between the epochs, the parameters of the deformation model are estimated and conclusions on the object deformations are drawn.

In geodetic deformation analysis, several approaches have been developed so far. The deformation analysis method applied in this study is called "deformation analysis with relative confidence ellipses". The subject area is located on a fault line near Gerede. The network established for the detection of possible crustal movements in the area covering 4.2 km^2 consists of 8 points. The deformation analysis has been carried out with respect to the results obtained through the direction and distance measurements made in 1983 and 1985. All observations in the two periods are evaluated with combined adjustment procedure as free nets. In this procedure some network points have been taken as datum points assuming them stable with respect to each other.

For this process, the datum point coordinate unknowns are taken as a one-valued set, but the other points are considered as two-valued set, each value corresponding to each period. Horizontal movements on the deformation points were determined with % 95 statistical confidences.

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