

Derivation of Datum Transformation Parameters for Dubai Emirate

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Key words: Datum, Seven Parameters, Dubai

SUMMARY

A Detail study about the transformation of parameters between two spheroid CLARK1880 and WGS84 in Dubai Emirates was carried out. Due to the non-homogeneity of the control on the Clark1880, made this study interesting even in a small area. The huge common control on the both the datum was used. Originally there were lot of control available on the Clark1880 with spirit level height and 70% of the same control points were observed with GPS on WGS84 spheroid. For the computation of transformation of parameters purpose, the area was classified into two parts one is Mainland and another is Hatta, which are 50 km apart.

Using the geoid solution and ellipsoidal solution, five sets of transformation parameters between the two systems were estimated for each solution. Both Bursa-Wolf and Molodensky-Badekas models were considered in this study. Particular attention was given to the conversion of orthometric heights to their corresponding ellipsoidal heights in the Clark1880 ellipsoid, through using Abridged Molodensky formulas and using the Dubai precise Geoid model.

The role of the geoid in estimating the transformation parameters is well defined. The optimal datum transformation parameters between the WGS84 datum and Clark1880 were determined, which is based on 2966 common points for the main-land and 88 common points in Hatta region with standard deviation of 0.15 cm in planimetry for the main-land and 0.13m for the Hatta region. The two sets of different seven optimal transformation parameters for the mainland and Hatta region were computed. A total of 3744 and 91 control points were tested for the mainland and Hatta region respectively. A Seven-parameter transformation on both models was found to be superior comparing to all other sets of parameters.