Comparison of Different Datum Transformation Techniques for Egypt

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Key words:

SUMMARY

In theory, the datum transformation is one of the simplest operations in surveying. In practice, just the opposite is true. Many complicated problems associate the datum transformation. Combining geodetic and satellite networks is always used to minimize the distortions in the geodetic networks. Many datum transformation techniques are available in practice. The most popular group is the similarity transformation based datum-shifts with fixed parameters (e.g., Bursa model, Molodensky model, etc.). The number of parameters changes based on the used model. The other group is the variable datum shifts model based on the surface polynomials. The last group considered within this study is the collocation (Kriging) datum transformation technique. The basic theories of the used models are given. A number of common stations in Egypt having known coordinates in both WGS84 and EG30 geodetic datums are available. The datum transformation parameters have been computed for all three groups, namely Bursa model, variable datum shifts model, and collocation (Kriging) model. A wide comparison between the obtained results is carried out. Generally, the Bursa model, as a representative of the similarity transformation based datum-shifts with fixed parameters, cannot model the distortion between the two datums in question (i.e., EG30 and WGS84). Both variable datum shifts model and collocation (Kriging) model gives better results.

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