Improved Practical Mechanism for Reconstruction of Old Cadastral Boundaries by Coordinate Transformation

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SUMMARY

Reconstruction of old cadastral boundaries is done according to the Survey of Israel regulations by means of coordinate transformation from the old to the new Israeli grid. The transformation is based on few original marks, which survived the fast development of Israel and are capable for re-measuring in the new grid. In order to establish new transformation instructions attached to new regulations, a research was conducted for the Survey of Israel in order to improve the results of cadastral coordinate transformations. The paper describes and presents an improved practical mechanism for cadastral coordinate- transformation. The new mechanism was tested at the beginning on simulated synthetic cases and then on many of real cases. The proposed mechanism includes a uniform automatic choice of the preferred transformation type, in the case shown between shift transformation and conformal, as well as built in outlier rejection process. A special, quite surprising, unorthodox idea concerning the weighting of the original points on which the transformation is based, is discussed. This weighting is used in the least square adjustment of the transformation. Another idea is suggested in order to estimate the accuracy of the transformed coordinates of boundary points to be reconstructed. Where necessary the proposed solutions presented in the paper are simple and practical.

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