ON THE ACCURACY ASSESSMENT OF DETERMINING THE COORDINATES OF CHARACTERISTIC POINTS OF REAL ESTATE OBJECTS IN THE CADASTRE

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The issues of accurate optimization of determining the location of the boundaries of land plots, the coordinates of real estate objects and other similar tasks during the performance and cadastral work are considered. Some typical situation that arises when coordinating the characteristic points of real estate objects is simulated. A real drop in the values of root-mean-square errors (RMSE) of the positions of the points of the "hanging" cadastral reference network (CRN) is demonstrated. The solution of this problem was performed using a synthesized version of the algorithm of the parametric version of the measurement adjustments, taking into account the coordinates errors of the reference network. The model parameters of the CRN were distorted by random errors of pseudo-measurements distributed according to the normal law. Each group of linear or angular pseudo-measurements was supported with a priori covariance matrix of a respective size. The variants of the situations, which consisted in fixating the point of establishing the instrument, were developed by regulating the respective covariance matrices, which were multiplied, where necessary, by a square unit matrix of an appropriate size, modulated with the multiplier $\alpha = 10^{-k}$. When the index of power k of base 10 was equal to zero, the covariance matrix assumed its priori value, corresponding to the generated normal characteristics of angular and linear measurements $m_\beta = 6''$ and $m_S = 2$ mm. If it was planned to "rule out" the impact of the errors of respective measurements, the index of power k was designated to be equal to -6. That resulted in a million-fold reduction of the influence of the modulated elements of the covariance matrix. Practically, such measurements were assumed to be error-free.

Keywords: borderlines of land plots, cadastral reference network, characteristic points, RMSE of a point position, regularization of covariance matrices, modeling multiplier

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