Mathematical Modeling of Integrated Errors in the Image Coordinates of the Points of Photogrammetric Images

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Key words: Photogrammetry;

SUMMARY

In theory photogrammetric photographs are seen as mathematical models - most often as a central projection of the captured object (anywhere in the report is made to the staffing photogrammetric images). A necessary condition for all tasks, both analytical and digital photogrammetry is in the knowledge of the interior orientation of the cameras shooting with sufficient accuracy. Furthermore, on real images under the effect of multiple factors are obtained deviation from the theoretical position of the points, i. E. Is obtained, so to speak, "relief of deformation". Therefore, the direct use of the measured coordinates shaped to solve various tasks photogrammetric leads to approximations and, in some cases (when significant deformation) and incorrect results. Photogrammetry developed mainly in two areas: 1. Creation of innovative technical means in order to extend the capabilities of photogrammetric systems, easing the work of the operators and increase the measuring accuracy; 2. Improvement of the theoretical foundations of photogrammetry, i. E. Of its mathematical apparatus. Currently, the accuracy of the final results in the processing of photogrammetric images is limited not so much by the instrumental errors as errors of representing variations in the position of the points of the image with respect to the ideal central projection. Causes of these errors are numerous - sprains lenses, refraction, deflection on the photographs, neprilepnalostta film and so on.. (These factors are more than 25). Despite the continuous improvement of the quality of the filming equipment on the photographs, and software, an important reserve for achieving high accuracy of the analytical processing of images is the reporting of residual errors in the individual points of photography. In laboratory tests can identify separate components of the variation in position of the points. In real terms, however, the integrated error caused by the impact of all factors differ from the sum of the individual components. The task would be solved most successfully through mathematical modeling in the field of integrated abnormal position of the points of photography. In this report, to solve its author proposes a fundamentally new approach. Since the surface of the deviations of the actual picture from the theoretical central projection is too complex and can not be mathematically exactly determined and set by analytical continuous function, valid over the entire image area, then to account for local deformations and achieving precision results it is logical, according to the author, photographs can be divided into sub-areas and for each of them to perform poelementno mathematical modeling of variation in position of the points. The report was made mathematical modeling of integrated errors in the image coordinates of the points of the pictures in the finite element method. A technique for the construction of an extended mathematical model of collinear dependence (adjustment of bundles projecting rays) finite elements are derived theoretical formulas for calculating the coefficients of the unknown corrections reflecting the integrated error in the image coordinates of the points of photogrammetric images .

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(7728)
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FIG Working Week 2015
From the Wisdom of the Ages to the Challenges of the Modern World
Sofia, Bulgaria, 17-21 May 2015