Assessment of the Accuracy and Precision of Deviations in Control Points through the Three-Point Resection Method

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Land surveying techniques have been changing rapidly from conventional methods over the past two decades. The resection method in surveying applications has made the processes more cost-effective and time-efficient. The three-point resection method (TPRM) is a widely used technique in surveying that enables the determination of the coordinates of a resected point with higher precision and accuracy which the coordinates may not be known. To improve the accuracy of the resection method further, this study examined and proposes a three-point resection method (TPRM) through a triangle model, which is combined with three known control points. This model identifies any impacts on the accuracy and precision of positions for resected points, irrespective of the points residing inside or outside the triangle. The primary objective of this study was to determine whether the control points can be established with higher accuracy and precision using the three-point resection method. Furthermore, the study aimed to determine the optimal positions extracted from a MATLAB function. The approximate values of the resected coordinates were initially estimated using the Kaestner-Burkhardt method (KBM). Least squares estimation was then applied to obtain the best-estimated coordinates of the resected point. The tertiary control coordinates and least square-adjusted coordinates were used to analyse the accuracy of the resected coordinates. The results show that the relationship between the precision of resected point coordinates, residing inside the triangle indicates higher precision than the points residing outside.

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