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Optimized Weight Selection of Control Data Based on Quotient Space of Multi-Geometric Features

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Abstract : The geometric processing of multi-source remote sensing data using control data of different scale and different accuracy is an important research direction of multi-platform system for earth observation. In the existing block bundle adjustment methods, as the controlling information in the adjustment system, the approach using single observation scale and precision is unable to screen out the control information and to give reasonable and effective corresponding weights, which reduces the convergence and adjustment reliability of the results. Referring to the relevant theory and technology of quotient space, in this project, several subjects are researched. Multi-layer quotient space of multi-geometric features is constructed to describe and filter control data. Normalized granularity merging mechanism of multi-layer control information is studied and based on the normalized scale factor, the strategy to optimize the weight selection of control data which is less relevant to the adjustment system can be realized. At the same time, geometric positioning experiment is conducted using multi-source remote sensing data, aerial images, and multiclass control data to verify the theoretical research results. This research is expected to break through the cliché of the single scale and single accuracy control data in the adjustment process and expand the theory and technology of photogrammetry. Thus the problem to process multi-source remote sensing data will be solved both theoretically and practically.

Keywords : multi-source image geometric process, high precision geometric positioning, quotient space of multi-geometric features, optimized weight selection
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