基于辅助控制点的QuickBird影像有理函数模型求解及其精度分析

Solution of Rational Polynomial Coefficients and its Accuracy in QuickBird Imagery based on Auxiliary Ground Control Points

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中文摘要

结合上海地区城市QuickBird高分辨率卫星影像，首先简述高分辨率影像定位中的通用传感器模型，有理多项式系数模型（RPC: Rational Polynomial Coefficients），通过在影像上选取均匀分布的50个地面控制点，运用正则化最小二乘迭代法计算得出RPC。然后分两种情况对求解出的PRC进行改正，即当同时具有原始GCP和辅助GCP时，应用正则化批处理最小二乘迭代法（BILSR）来改正RPC系数，而当只有辅助GCP时，则使用增量离散卡尔曼滤波方法（IDKF）来改正RPC精度。最后利用40个检测点，设计多种方案的实验并进行分析，以此为基础对BILSR和IDKF法的可行性进行了对比分析,认为辅助控制点的选择应侧重其本身更高的精度而不是单纯从数量上考虑，此外得出城市高分率卫星影像几何处理的一些结论。

英文摘要

Relative to the rigorous physical model, Rational polynomial coefficient (RPC) had been adopted as an alternative common sensor model data for image Geometric correction exploitation. Based on collected QuickBird imagery in Shanghai region, the iterative least-squares solution with regularization(ILSR) are derived to determine the RPCs by using 50 fair distributed ground control points (GCPs) firstly. Two methods are then used to refine determined RPCs under different circumstance as: 1) when both the original and the additional GCPs are available, the RPCs wiould be recomputed using the batch iterative least-squares solution with regularization (BILSR) method; and 2) when only the new GCPs were available, incremental discrete Kalman filtering (IDKF) method had then been described. Meanwhile, schemes were scheduled with check points to evaluate their geo-positioning accuracy. It is obtained that auxiliary points are necessary to refine the RPC because of their higher position accuracy rather than the amount used. Some conclusion is then achieved as a reference when the high resolution imagery is processed in metropolitan area.

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