

技术方法

无需初值的RPC模型参数求解算法研究

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摘要:

针对国内外研究者求解RPC(Rational Polynomial Camera)模型参数的算法需要初值及迭代处理,且求解过程相当复杂的缺憾,提出基于全球DEM无需初值的RPC模型参数求解算法。利用SPOT-5卫星影像进行试验,获得该算法对线阵推扫式卫星遥感影像有意义的结论。对SPOT-5卫星影像在利用严格成像模型求解RPC模型参数时,进行了控制点格网大小及高程分层数对求解精度的影响试验,得出:对SPOT-5卫星影像,采用控制点的格网大小为20像素×20像素、高程分层数为3时,可以达到精度和效率的平衡。

关键词: RPC模型 初值 最小二乘

THE ALGORITHM FOR PARAMETERS OF RPC MODEL WITHOUT INITIAL VALUE

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Abstract:

The RPC model has recently aroused considerable interest in the community of photogrammetry and remote sensing. The RPC is a generalized sensor model capable of achieving high approximation accuracy. Unfortunately, the computation of the parameters of RPC model is subject to the initial value of the parameter in all the literature available. In this paper, an algorithm for parameters of RPC model without initial value is presented. The algorithm was tested on SPOT-5 image. Based on numerous tests, some conclusions can be drawn. The RPC model can achieve an approximation accuracy that is extremely high for SPOT-5 pushbroom data. The results prove that the RPC model can be used as a replacement sensor model for photogrammetric restitution. When we deal with SPOT-5 data sets, the high order RPC model may be necessary in that the RPC model very much resembles the rigorous sensor model. The RPC model cases with unequal denominator can on the whole achieve better accuracy than the cases with equal denominator at check points. The RPC model cases with denominator perform better. In the establishment of the 3-D object grid for the RPC model solutions, at least two or more elevation layers are needed. For SPOT-5 imagery, when the image grid contains 21×21 point and the number of elevation layers is three, the precision and the efficiency is in balance.

Keywords: RPC model Initial value Least square method

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