Abstract

Sensor models are required to establish the relationship between 3D object space and 2D image space. Traditionally this is done using the physical sensor model where the complete parameters of physical imaging system are known. The replacement sensor models are required to establish this relation without the knowledge of the physical sensor model. The rational function model (RFM) is one of the replacement model used in remote sensing with 78 rational polynomial coefficients (RPCs). RFM is a complete mathematical model, which approximately describes the physical imaging process in photogrammetry and remote sensing. In the absence of interior and exterior orientation such as camera model, position and orientation information of specific sensor, large number of ground control points (GCPs) are needed to solve all the unknown coefficients of the RFM and to achieve higher accuracies in the photogrammetric processing. The rational function model (RFM) can be used either as a replacement for physical sensor model (terrain dependent) or to express the physical model in
the form of RPCs (terrain independent) for further processing.

In this paper the implementation aspects of terrain dependent RFM model for Cartosat-1 data for the Chitrapur, Simla, Himachal Pradesh state, India and the accuracies achieved and the stability of the model are discussed. The direct least square solutions to the RFM are implemented using row reduction. The validation of RFM is done at check points and achieved planimetric accuracy 1.5m, 3.38m with respect to CE90 in X and Y directions respectively.

References


Index Terms

Computer Science
Information Sciences

Keywords

Feature editing, RFM, row reduction, Sensor Model, CE90.