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基于改进型偏最小二乘回归法导弹磁补偿研究 (PDF)

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Title: The Research of Missile Magnetic Compensation Based on Improved Partial Least Square Regression

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关键词: 偏最小二乘回归; 背景磁场; 复共线性; 参数估计

Keywords: partial least square regression; background magnetic field; mu lticollinearity; parameter estimation

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摘要: 通过分析导弹背景磁场模型，针对导弹背景磁场模型存在的复共线性问题，提出基于偏最小二乘回归 法模型参数估计方法。为了消除系统噪声对参数估计影响，对偏最小二乘回归参数估计方法进行改进，利用 正交投影原理消除测量数据中无关信息。仿真说明偏最小二乘回归能够克服导弹背景磁场模型的复共线性， 提高模型参数估计精度，但其对噪声抑制能力较差;而改进的偏最小二乘回归法不但能提高参数估计精度，对 系统噪声具有一定的抑制作用。

Abstract: The magnetic compensation of missile is necessary for preci sely measurement of geomagnetic field. Based on aircraft magnetic model, the missile magnetic model was analyzed. T o eliminate multicollinearity of the model, partial least square regression was proposed to estimate parameters of th e model. Partial least square was improved to suppress the systematic noise using orthogonal projection to eliminate nois e influence. The simulation shows that partial least square can solve multicollinearity of the model, but it has poor performance of noise suppressant. The improved partial least square method can not only implement parametric estimation u nder multicollinearity, but also can eliminate of noise influence.

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