

基于整体最小二乘的椭圆拟合方法

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摘 要: 针对传统椭圆拟合方法中存在的无法剔除噪声点并且参数误差较大的缺陷, 提出了一种基于随机采样一致性、约束条件及整体最小二乘的椭圆拟合改进算法. 该方法首先根据椭圆的性质, 利用随机采样一致性剔除噪声点, 再利用基于约束条件的整体最小二乘法, 对去噪之后的数据进行椭圆拟合. 实验证明, 随机采样一致算法能很好地去除噪声, 并且跟传统最小二乘法的拟合结果相比较可以看出, 改进之后的拟合方法拟合出的椭圆参数精度更高.

关键词: 椭圆拟合; 噪声点; 随机采样一致; 约束条件; 整体最小二乘

A Method of Ellipse Fitting Based on Total Least Squares

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Abstract: Considering the fact that the defects of failing to eliminate the noise and large errors existed in traditional ellipse fitting method, the improved method with the foundation of Random Sample Consensus (RANSAC), constraint condition and total least squares was proposed. The new method first use the Random Sample Consensus to eliminate the noise based on the property of ellipse, then the ellipse is fitted by the total least squares with constraint condition. The experimental results show that the RANSAC algorithm can effectively remove the noise of data. The new method has a higher precision on parameter of ellipse compared with the traditional least squares method.

Key words: ellipse fitting; noise data; RANSAC; constraint condition; total least squares

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