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Fitting Parabolas in Noisy Images[☆]

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Abstract

A novel approach to fitting parabolas to scattered data is introduced by putting special emphasis on the robustness of the approach. The robust fit is achieved by not taking into account a proportion α of the "most outlying" observations, allowing the procedure to trim them off. The most outlying observations are self-determined by the data. Procrustes analysis techniques and a particular type of "concentration" steps are the keystone of the proposed methodology. An application to a retinographic study is also presented.

Keywords: Parabola fitting, Robustness, Procrustes analysis, Retinography.

1. Introduction

The accurate fitting of conic sections to a given data set is an ongoing prerequisite in many applications, including image analysis. For instance, the automatic discovery of underlying conic sections in biomedical images is frequently needed. Moreover, the presence of noisy observations in these

[☆] The analysis of some additional binarized retinal images can be found as a supplementary material to the electronic version of the paper.

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