数学与系统科学研究院

计算数学所学术报告

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报告题目：

A Fast Hyperplane-based Minimum-Volume Enclosing Simplex Algorithm for Blind Hyperspectral Unmixing

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报告时间：2016 年 7 月 19 日（周二）下午 15:30-16:30

报告地点： 科技综合楼三层 **311** 报告厅

Abstract:

Hyperspectral unmixing (HU) is a crucial signal processing procedure to identify the underlying materials (or endmembers) and their corresponding proportions (or abundances) from an observed hyperspectral scene. A well-known blind HU criterion, advocated by Craig during the early 1990s, considers the vertices of the minimum-volume enclosing simplex of the data cloud as good endmember estimates, and it has been empirically and theoretically found effective even in the scenario of no pure pixels. However, such kinds of algorithms may suffer from heavy simplex volume computations in numerical optimization, etc. In this talk, without involving any simplex volume computations, by exploiting a convex geometry fact that a simplest simplex of N vertices can be defined by N associated hyperplanes, a fast blind HU algorithm that was recently published is introduced, for which each of the N hyperplanes associated with the Craig's simplex of N vertices is constructed from N-1 affinely independent data pixels, together with an endmember identifiability analysis for its performance support. Without resorting to numerical optimization, the devised algorithm searches for the N(N-1) active data pixels via simple linear algebraic computations, accounting for its high computational efficiency. Monte Carlo simulations and real data experiments are provided to demonstrate its consistent superior efficacy over some benchmark Craig-criterion-based algorithms in both computational efficiency and estimation accuracy.

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