数学与系统科学研究院

计算数学所学术报告

报告人：　Prof. TAI XUE-CHENG

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报告题目：

A FAST GLOBAL OPTIMIZATIO N-BASED APPROACH TO EVOLV ING CONTOURS WITH GENERIC SHAPE PRIOR

邀请人：　谢和虎 副研究员

报告时间：2015 年 8 月 21 日（周五）

上午 10:00~11:00

报告地点：　数学院南楼七层

702 会议室

Abstract:

In this talk, we present a new global optimizationbased approach to contour evolution, with or without the novel variational shape constraint that imposes a generic star shape using a continuous max-flow framework. In theory, the proposed continuous max-flow model provides a dual perspective to the reduced continuous min-cut formulation of the contour evolution at each discrete time frame, which proves the global optimality of the discrete time contour propagation. The variational analysis of the ow conservation condition of the continuous max-flow model shows that the proposed approach does provide a fully time implicit solver to the contour convection PDE, which allows a large time-step size to significantly speed up the contour evolution. For the contour evolution with a star shape prior, a novel variational representation of the star shape is integrated to the continuous max-flow-based scheme by introducing an additional spatial ow. In numerics, the proposed continuous max-floow formulations lead to ecient duality-based algorithms using modern convex optimization theories. Our approach is implemented in a GPU, which significantly improves computing eciency. We show the high performance of our approach in terms of speed and reliability to both poor initialization and large evolution step-size, using numerous experiments on synthetic, real-world and 2D/3D medical images.

This talk is based in a joint work by: J. Yuan, E. Ukwatta1, X.C. Tai, A. Fenster, C. Schnorr.

欢迎大家参加！