

Computer Science Seminar Series, 2010

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The Digital-Discrete Method for Smooth-Continuous Data Reconstruction

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Abstract

A systematic digital-discrete method for obtaining continuous functions with smoothness to a certain order (C^n) from sample data is designed. This method is based on gradually varied functions and the classical finite difference method. This new method has been applied to real groundwater data and the results have validated the method. This method is independent from existing popular methods such as the cubic spline method and the finite element method. The new digital-discrete method has considerable advantages for a large amount of real data applications. This digital method also differs from other classical discrete method that usually uses triangulations. This method can potentially be used to obtain smooth functions such as polynomials through its derivatives $f^{(k)}$ and the solution for partial differential equations such as harmonic and other important equations.

Biography

Dr. Li Chen is an associate professor in computer science at the University of the District of Columbia. He is currently working on problems in image segmentation algorithms, complexity analysis of algebraic groups, and the relationship between finite elements and gradually varied fitting. Li Chen received his BS, MS, and Ph.D. all in CS from Wuhan University(1982), Utah State University(1995), and University of Bedfordshire (Luton, UK, 2001), respectively. His work includes: 1) The best algorithm for the check matrix of the well-known error-correction Hsiao codes; 2) Solving algorithms for fuzzy relation equation; 3) The lambda-connected search algorithm for image segmentation, a dual-technique to threshold segmentation, the most popular segmentation method. He is now working on the 3D data reconstruction. www.udc.edu/prof/chen.