UNIVERSITY OF CALIFORNIA
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MESA (Mechatronics, Embedded Systems and Automation) Lab

Presents

A Research Seminar at The

Applied Fractional Calculus (AFC) Workshop Series

Date/Time/Place: 05/19/2014, 4-6PM, MESA Lab (Room 820), 4225 N. Hospital Rd., Atwater, CA 95301. T: 209-2284398

Title: High Order Numerical Approximation to Caputo Derivative and Its Application

Abstract: Numerical approach to approximate fractional calculus is an important branch in the research of fractional calculus. Caputo derivative is one of the most important used definition in scientific applications. This presentation first gives a brief overview of three common used fractional derivatives, and then proposes a new high order accuracy numerical discretization to Caputo derivative. At last, using this scheme to numerically solve a advection-dispersion equation.

Speaker Name / Contact: Jianxiong Cao, jcao6@ucmerced.edu

Speaker's short biography:

Jianxiong Cao is a PhD candidate in the department of Mathematics at Shanghai University, China. He received the B.S. in Applied Mathematics from Tianshui Normal University, China in 2010. Then he went to Shanghai University to take five years PhD program. He now is an exchange student in MESA Lab, UC Merced. His current study and research focuses on the numerical solution to fractional partial differential equations and its application in control problem.

Key references:

[1]. Lubich, Ch. "Discretized fractional calculus." SIAM Journal on Mathematical Analysis 17.3 (1986): 704-719.

[2]. Li, Changpin, and Weihua Deng. "Remarks on fractional derivatives." Applied Mathematics and Computation 187.2 (2007): 777-784.

[3]. Gao, Guang-hua, Zhi-zhong Sun, and Hong-wei Zhang. "A new fractional numerical differentiation formula to approximate the Caputo fractional derivative and its applications." Journal of Computational Physics 259 (2014): 33-50.

Integer-Order Calculus

Fractional-Order Calculus