



Announcing

A COS Seminar

April 17, 2009 at 2:00 pm

Southern Hall 303

at The University of Southern Mississippi

Speaker: John Crispell

The Center for Computational Science
Tulane University

Title: A Fractional Step θ -method for Fluid Flow Problems

Abstract:

The accurate numerical approximation of viscoelastic fluid flow poses two difficulties: the large number of unknowns in the approximating algebraic system (corresponding to velocity, pressure, and stress), and the different mathematical types of the modeling equations. Specifically, the viscoelastic modeling equations have a hyperbolic constitutive equation coupled to a parabolic conservation of momentum equation. An appealing approximation approach is to use a fractional step θ -method. The θ -method is an operator splitting technique that may be used to decouple mathematical equations of different types as well as separate the updates of distinct modeling equation variables when modeling mixed systems of partial differential equations.

In this talk a fractional step θ -method is described, and its analysis outlined for both the time dependent convection-diffusion equation and the time dependent equations of viscoelastic fluid flow using the Johnson-Segalman constitutive model. Numerical computations supporting the theoretical results and demonstrating the θ -method will also be presented.

Further Information

Further details and information about this and other departmental activities is available online at http://www.math.usm.edu/bulletin_board/.