

# **Department of Mathematical Sciences**

## **Seminar Announcement**

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Clifford H. Spicer Chair in Engineering**

**Designing and Developing Rosenbrock Methods for  
Solving Stiff Systems of Ordinary Differential Equations:  
an invitation for collaborative research**

Thursday, November 13, 2008

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2:45 – 3:45 PM

Brown Hall – Room 218

The purpose of this talk is to outline a research activity that I have been engaged in over the past two decades, and to present an unsolved problem that I believe would make a nice student(s) research project.

Rosenbrock methods are numerical integration algorithms especially designed to handle stiff systems of ordinary differential equations where classical methods fail, e.g., Runge-Kutta methods. Rosenbrock methods are actually extensions of Runge-Kutta methods. Historically, Rosenbrock methods have been designed to minimize error and maximize stability without regard to the integrity of the Runge-Kutta method contained within.

In the approach to be followed, the design process begins with an a priori selection of a "quality" Runge-Kutta method upon which we shall build a new Rosenbrock method. Examples will be given. The design approach can be motivated via finite element theory.