THE UNIVERSITY OF CHICAGO

Departments of Computer Science, Mathematics, Statistics, and the Computation Institute

SCIENTIFIC AND STATISTICAL COMPUTING SEMINAR

EMIL CONSTANTINESCU

Laboratory for Advanced Numerical Simulations

Argonne National Laboratory

A Posteriori Error Estimation for Differential Equations

THURSDAY, April 17, 2014, at 4:30 PM

Eckhart 133, 5734 S. University Avenue

ABSTRACT

The a posteriori error or global error represents the actual discretization error resulting after solving a system of differential equations. I will focus on time-stepping methods for ordinary, partial, and differential algebraic equations. Calculating a posteriori errors is generally viewed as an expensive process, and therefore in practice only the (local) error from one step to the next is used to estimate the global errors. However, local error estimation is not always suitable and may lead to catastrophic error underestimation. I review several strategies for a posteriori error estimation and introduce a new approach that generalizes the classical approaches and yields inexpensive algorithms. I will present a few explicit self-starting schemes akin to Runge-Kutta methods with global error estimation and illustrate the theoretical considerations on simple problems.

Organizers:

Lek-Heng Lim, Department of Statistics, lekheng@galton.uchicago.edu,

Ridgway Scott, Departments of Computer Science and Mathematics, ridg@cs.uchicago.edu,

Jonathan Weare, Department of Statistics and The James Franck Institute, weare@uchicago.edu.

SSC Seminar URL: `http://www.stat.uchicago.edu/seminars/SSC_seminars.shtml`

If you wish to subscribe to our email list, please visit the following website:
`https://lists.uchicago.edu/web/arc/statseminars.`