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Frontiers of Scientific Computing Lecture Series

Color Printers, Mailboxes, Fish, and Homer Simpson or Centroidal Voronoi Tesselations: Algorithms and Applications

Max Gunzburger, Florida State University

Johnston Hall 338
February 04, 2010 - 03:30 pm

Abstract:

Centroidal Voronoi tessellations (CVTs) are special Voronoi diagrams for which the generators of the diagrams are also the centers of mass (with respect to a given density function) of the Voronoi cells. CVTs have many uses and applications, a non-exhaustive list of which includes data compression, image segmentation and edge detection, clustering, cell biology, territorial behavior of animals, resource allocation, stippling, grid generation in volumes and on surfaces, meshless computing, hypercube sampling, and reduced-order modeling. We discuss mathematical features of CVTs that give an indication of why they are so effective as well as deterministic and probabilistic methods for their construction. Our main focus, however, is on considering as many applications of CVTs as time permits.

Speaker's Bio:

Max Gunzburger is a Francis Eppes Eminent Professor and Founding Chair of the newly formed Department of Scientific Computing a Florida State University. He previously held positions at Iowa State University, Virginia Tech, Carnegie Mellon University, and the University of Tennessee, as well a government laboratories. He is a Charter Fellow of the Society for Industrial and Applied Mathematics and is a recipient of the W.T. and Idelia Reid Prize in Mathematics from that organization. He is a Senior Research Fellow of the Computer Science Research Institute at the Sandia National Laboratories. Gunzburger's main current research interests are in the numerical analysis of PDEs, especially finite element methods, centroidal Voronoi tessellations, climate modeling, subsurface flows, PDEs with random inputs, multiscale material science, and superconductivity. In addition to family, mathematics, and computations, his passions include food and baseball.

Refreshments will be served.
This lecture has a reception.