



School of Natural Sciences Applied Math Seminar Series

UCMERCED

New High-Order Methods Using Gaussian Processes for High-Performance Computing

Date:

Friday,

09/16/16

Time:

3:30 pm

Location:

COB 113

For More
Information
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Abstract:

We present an entirely new class of high-order numerical algorithms for computational fluid dynamics, particularly suitable for modern extreme scale high-performance computing architectures. The new method is based on the Gaussian Processes (GP) modeling that generalizes the Gaussian probability distribution. Our approach is to adapt the idea of the GP prediction technique which utilizes the covariance kernel functions, and use it to reconstruct a high-order approximations for computational simulations. We propose the GP high-order method as a new numerical high-order formulation, alternative to the conventional polynomial-based approaches.

Bio:

Dongwook Lee is an assistant professor of the Applied Mathematics and Statistics Department at the University of California, Santa Cruz. Dongwook's research interests emphasize on developing numerical schemes of high-order Godunov shock capturing methods for computational magnetohydrodynamics (MHD) and gas dynamics using explicit and implicit time integration algorithms on large scale computing architectures. Prior to joining to the current position at UC Santa Cruz, he was an applied mathematician at the Flash Center for Computational Science at the University of Chicago. He was a main code architect of the unsplit hydrodynamics and magnetohydrodynamics solvers in FLASH.