Computational Science Seminar

A Two-Level Multithreaded Delaunay Kernel

09 May 2016 - Campus Kirchberg - Room A02 - 14:00-15:00

PRESENTATION

Prof. Jean-François Remacle will present a fine grain parallel version of the 3D Delaunay Kernel procedure using the OpenMP (Open Multi-Processing) API. A set $S = \{p_1, \ldots, p_n\}$ of $n$ points is taken as input. $S$ is initially sorted along a space-filling curve so that two points that are close in the insertion order are also close geometrically. The sorted set of points is then divided into $M$ subsets $S_i$, $1 \leq i \leq M$ of equal size $n/M$. The multithreaded version of the Delaunay kernel inserts $M$ points at a time in the triangulation. OpenMP barriers provide the required synchronization that is needed after each multiple insertion in order to avoid data races. This simple approach exhibits two standard problems of parallel computing: load imbalance and parallel overheads. Those two issues are addressed using a two-level version of the multithreaded Delaunay kernel.

SPEAKER

Jean-François Remacle is an associate Professor at the Université Catholique de Louvain in Belgium. He got his Ph.D. from the University of Liège (Belgium) in 1997. After a Post Doc at Ecole Polytechnique de Montréal (Canada), he joined the Scientific Computation Research Center (RPI/NY) in 1999, first as a research associate and then as research associate Professor. He joined the Université Catholique de Louvain in 2002.

Pr. Remacle’s research focuses on scientific computing. He is currently active in the development of high order discontinuous Galerkin methods with applications to CFD and ocean modeling. He is also working actively on mesh generation. Pr. Remacle is one of the two co-authors of Gmsh, the open source mesh generator and is an associate editor of SISC, the SIAM Journal on Scientific Computing.

CONTACT

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