New ideas in Wavelet Methods

Brandon Gusto & Gordon Erlebacher

January 9, 2018

1 A Single-Precision Implementation of the Adaptive Wavelet Collocation Method on GPUs

The goal of this effort is to take advantage of the multi-resolution properties of wavelets in order to solve partial differential equations on a two-dimensional adaptive grid using single-precision graphical processing units. Single-Precision GPU computing offers greater computing speeds compared with double precision computing. If an efficient numerical scheme which overcame the issues of round-off error using single-precision computing was implemented on GPUs, it could potentially be of use in practical engineering applications.

2 A Moment-of-Fluid Wavelet Collocation Approach for Multi-Phase Flows

The AWCM could be combined with a finite volume formulation at the finest grid level, while using the moment-of-fluid method for interface reconstruction.

3 An Arbitrary Lagrangian-Eulerian Wavelet Collocation Method