

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

An efficient data structure for three-dimensional vertex based finite volume method SEMIH AKKURT, MEHMET SAHIN, Istanbul Tech Univ — A vertex based three-dimensional finite volume algorithm has been developed using an edge based data structure. The mesh data structure of the given algorithm is similar to ones that exist in the literature. However, the data structures are redesigned and simplified in order to fit requirements of the vertex based finite volume method. In order to increase the cache efficiency, the data access patterns for the vertex based finite volume method are investigated and these data are packed/allocated in a way that they are close to each other in the memory. The present data structure is not limited with tetrahedrons, arbitrary polyhedrons are also supported in the mesh without putting any additional effort. Furthermore, the present data structure also supports adaptive refinement and coarsening. For the implicit and parallel implementation of the FVM algorithm, PETSc and MPI libraries are employed. The performance and accuracy of the present algorithm are tested for the classical benchmark problems by comparing the CPU time for the open source algorithms.

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Date submitted: 08 Nov 2017

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