A Scalable Parallel Fast Marching Method[1] YAJING GALE, MARCUS HERRMANN, Arizona State University — The fast marching method is an efficient strategy to solve the Eikonal equation with broad applications in computational fluid dynamics. However, the traditional fast marching method is a purely sequential algorithm and thus not straightforward to parallelize. In this presentation, four parallel fast marching methods are discussed: the non-blocking parallel fast marching method (NB-PFMM), the blocking parallel fast marching method (B-PFMM), the extended domain-blocking parallel fast marching method (DB-PFMM), and the layered-blocking parallel fast marching method (LB-PFMM). When combined with proper domain decomposition approaches, these methods are not only efficient but can scale over a wide range of processor counts. The applicability and performance of the different parallel fast marching methods are presented and compared as applied to a variety of test cases.

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