

# An efficient parallel aggregative algebraic multigrid solver on Sunway many-core architectures

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## Abstract

Multigrid is proven as the optimal solver for large sparse linear systems in most cases. In this work, we focused on a parallel aggregative algebraic multigrid (AMG) solver based on unstructured mesh. The solver is optimized and accelerated from algorithms and data layout on the Sunway Taihulight supercomputer, which is the fastest supercomputer in China and is based on a homegrown heterogeneous many-core processor called SW26010. To make full use of the potential ability of supercomputer, many efforts are paid including but not limited to coarse grid generation, relaxation operator, restriction and interpolation operator. A significant performance improvement has been observed in many applications of the optimized AMG solver.

**Keywords:** parallel, aggregative algebraic multigrid, Sunway architecture