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Enhanced Capabilities of the Spike Algorithm and a New Spike-OpenMP Solver

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Abstract

SPIKE is a parallel algorithm to solve block tridiagonal matrices. In this work, two useful improvements to the algorithm are proposed. A flexible threading strategy is developed, to overcome limitations of the recursive reduced system method. Allo- cating multiple threads to some tasks created by the SPIKE algorithm removes the previous restriction that recursive SPIKE may only use a number of threads equal to a power of two. Additionally, a method of solving transpose problems is shown. This method matches the performance of the non-transpose solve while reusing the original factorization.

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