

COMBINATORIAL OPTIMIZATION TECHNIQUES APPLIED TO A PARALLEL PRECONDITIONER BASED ON THE SPIKE ALGORITHM

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Abstract. Parallel algorithms capable to use efficiently thousands of multi-core processors is the trend in High Performance Computing. To achieve a high scalability, hybrid solvers are suitable candidates since they can combine the robustness of direct methods and the low computational cost of iterative methods. The parallel hybrid SPIKE algorithm [1] has been used as a preconditioner on a non-stationary iterative solver combining distributed and shared memory architectures MPI/OpenMP. In this work we apply several combinatorial problems [2] such as reorderings, partitionings and matchings to obtain a good preconditioner. We present results of speedup and scalability as well as comparisons of different approaches for the combinatorial algorithms in a set of large benchmark matrices from CISE [3].

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