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PARALLEL ADAPTIVE MESH ALGORITHMS FOR MULTICORE ARCHITECTURES

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Abstract. Problems that require dynamic adaptation of an unstructured mesh are particularly challenging for multicore architectures. This work tackles concurrency control, memory management and locality in the context of adaptive mesh finite element simulations. We present experimental analysis of a range of implementation alternatives, and we demonstrate that good performance and parallel speedup are achievable. We study both OpenMP intra-node parallelisation and MPI internode parallel execution, with particular attention to memory hierarchy and NUMA issues.