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# PARALLEL OPTIMIZATION OF TETRAHEDRAL MESHES

**D. Benítez[1], E. Rodríguez[1], J.M. Escobar[1] and R. Montenegro[1]**

[1] University Institute for Intelligent Systems and Numerical Applications in Engineering (SIANI), University of Las Palmas de Gran Canaria, 35017 Las Palmas, Spain, domingo.benitez@ulpgc.es, www.dca.iusiani.ulpgc.es/proyecto2015-2017

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We propose a new algorithm on distributed-memory parallel computers for our simultaneous untangling and smoothing of tetrahedral meshes [1, 2]. A previous parallel implementation on shared-memory computers is analyzed in [3]. The new parallel procedure takes ideas from Freitag et al. strategy [4]. The method is based on: partitioning a mesh, optimizing interior vertices, optimizing boundary vertices of interior partitions, and communicating updated coordinates of boundary vertices. This paper presents performance evaluation results of our parallel algorithm. We apply the procedure in the mesh generation of several 3-D objects by using the meccano method [5]. High levels of speed-up are obtained in the mesh optimization step of this method. However, several bottlenecks may limit the parallelism. We provide some hypotheses about the factors that cause more parallel overhead. The relative number of elements, that are located at the interfaces of the sub-domains of the object, is one of the more important aspects for the efficiency of the parallel mesh optimization.

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