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**Improvements in the reliability and element quality of parallel tetrahedral mesh generation.**  
(English) [Zbl 1352.65605](#)  
*Int. J. Numer. Methods Eng.* 92, No. 8, 671-693 (2012).

**Summary:** The paper presents a parallel tetrahedral mesh generation approach based on recursive biddivisions using triangular surfaces. Research was conducted for addressing issues concerning mesh generation reliability and element quality. A novel procedure employing local modification techniques is proposed for repairing the intersecting interdomain mesh instead of directly repeating the biddivision procedure, which improves the robustness of the complete meshing procedure significantly. In addition, a new parallel quality improvement scheme is suggested for optimizing the distributed volume meshes. The scheme is free of any communication cost and highly efficient. Finally, mesh experiments of hundreds of millions of elements are performed to demonstrate the reliability, effectiveness and efficiency of the proposed method and its potential applications to large-scale simulations of complex aerodynamics models.

**MSC:**

**65N50** Mesh generation, refinement, and adaptive methods for boundary value problems involving PDEs Cited in 1 Document  
**65Y05** Parallel numerical computation

**Keywords:**

[mesh generation](#); [parallel algorithms](#); [domain decomposition](#); [Delaunay triangulations](#); [quality improvement](#)

**Software:**

[HEDP](#)

**Full Text:** [DOI](#)

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