Tetrahedralization of Isosurfaces with Guaranteed-Quality by Edge Rearrangement (TIGER)[1] SHAWN WALKER, Louisiana State University — We present a method for generating tetrahedral meshes of solids whose boundary is a smooth surface. The method uses a background grid (body-centered-cubic (BCC) lattice) from which to build the final conforming 3-D mesh. The algorithm is fast, robust, and provides useful guaranteed dihedral angle bounds for the output tetrahedra. The dihedral angles are bounded between 8.5 and 164.2 degrees. If the lattice spacing is smaller than the "local feature size," then the dihedral angles are between 11.4 and 157.6 degrees (c.f. Labelle, Shewchuk 2007). The method is simple to implement and performs *no* extra refinement of the background grid. The most complicated mesh transformations are 4-4 edge flips. Moreover, the only parameter in the method is the BCC lattice spacing. Applications of the method range from free boundary flows, to modeling deformations, shape optimization, and to anything that requires dynamic meshing such as virtual surgery. A MATLAB demonstration will be given to show case the method.

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