MTCut: GPU-based Marching Tetra Cuts

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Isosurface construction and rendering based on tetrahedral grids has shown to be feasible on programmable graphics hardware. In this paper we present MTCut: a volume cutting algorithm that is able to cut isosurfaces obtained by a Marching Tetrahedra algorithm on volume data. It does not require a tetrahedral representation and runs in real time for complex meshes of up to 1.8M triangles. Our algorithm takes as input the isosurface to be cut, slices it, and produces the cut geometry in response to the user interaction with a haptic device. The result is a watertight manifold that can be interactively recovered back to CPU in response to a user request.