Parameterization-free Meshing of Defect-laden NURBS Models

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Résumé
CAD models represented by NURBS surface patches are often hampered with defects due to inaccurate representations of trimming curves. Such defects make these models unsuitable to the direct generation of valid volume meshes, and often require trial-and-error processes to fix them. We propose a fully automated Delaunay-based meshing approach which can mesh and repair simultaneously, while being independent to the input NURBS patch layout. Trimming curves are covered with balls sized in accordance to geometric features and user-defined criteria. Sharp features and smooth surface connections are dealt with via protecting and blending balls, respectively. Our approach proceeds by Delaunay filtering and refinement, in which defect-laden trimmed areas are repaired through implicit surfaces. Beyond repair, we demonstrate its capability to smooth out sharp features, defeature small details, and mesh multiple domains in contact.