Para-graph: Graph-based parameterization of triangle meshes with arbitrary genus

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Abstract: This paper describes a novel approach to the parameterization of triangle meshes representing 2-manifolds with an arbitrary genus. A topology-based decomposition of the shape is computed and used to segment the shape into primitives, which define a chart decomposition of the mesh. Then, each chan is parameterized using art extension of the barycentric coordinates method. The charts are all 0-genus and can be of three types only. depending on the number of boundary components. The chart decomposition and the parameterization are used to define a shape graph where each node, represents one primitive and the arcs code the adjacency relationships between the primitives. Conical and cylindrical primitives are coded together with their skeletal lines that are computed from and aligned with their parameterization. The application of the parameterization approach to remeshing guarantees that extraordinary vertices are localized only where two patches share a boundary and they are not scattered on the whole surface.

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