Real-time Volume Sculpting System Using Implicit Functions

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Abstract

Our system integrates implicit functions with parametric representation such as piecewise scalar B-splines, which permits interactive and direct manipulation of implicit solids in real-time. All the solids sculpted in our environment are semi-algebraic sets of volumetric implicit functions. By further enhancing our system with physics-based modeling capability, we unify both geometric and physical aspects for implicit solid modeling. We have developed a large variety of sculpting toolkits equipped with a haptic interface to facilitate the direct and intuitive manipulation.

KeyWords: Geometric Modeling, B-splines, Implicit Function, Volume Sculpting, Haptic Interface.

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