Adaptive Isocurves Based Rendering
for Freeform Surfaces

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Abstract

Freeform surface rendering is traditionally performed by approximating the surface with polygons and then rendering the polygons. This approach is extremely common because of the complexity in accurately rendering the surfaces directly. Recently, several papers presented methods to render surfaces as sequences of isocurves. Unfortunately, these methods start by assuming that an appropriate collection of isocurves has already been derived. The algorithms themselves neither automatically create an optimal or almost optimal set of isocurves so the whole surface would be correctly rendered without having pixels redundantly visited nor automatically compute the parameter spacing required between isocurves to guarantee such coverage.

In this paper, a new algorithm is developed to fill these needs. An algorithm is introduced that automatically computes a set of almost optimal isocurves covering the entire surface area. This algorithm can be combined with a fast curve rendering method, to make surface rendering without polygonal approximation practical.