



Technion-Israel Institute of Technology

Computer Science Department

Center for Graphics and Geometric Computing

CGGC Seminar

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Precise Convex Hull Computation for Freeform Models using a Hierarchical

Gauss Map and a Coons Bounding Volume Hierarchy



We present an interactive-speed algorithm for computing the precise convex hull of freeform geometric models. The algorithm is based on two pre-built data structures: (i) a Gauss map organized in a hierarchy of normal pyramids and (ii) a Coons bounding volume hierarchy (CBVH) which effectively approximates freeform surfaces with a hierarchy of bilinear surfaces. For the axis direction of each normal pyramid, we sample a point on the convex hull boundary using the CBVH. The sampled points together with the hierarchy of normal pyramids serve as a hierarchical approximation of the convex hull, with which we can eliminate the majority of redundant surface patches. We compute the precise trimmed surface patches on the convex hull boundary using a numerical tracing technique and then stitch them together in a correct topology while filling the gaps with tri-tangent planes and bi-tangent developable scrolls. We demonstrate the effectiveness of our algorithm using experimental results.

The lecture will be held on Sunday, 3.11.2013, at 13:00, Taub 337

Snacks and Beverages at 12:45

הזמנה זו מהווה אישור כניסה עם רכב לטכניון