

# Truncated Hierarchical Loop Subdivision

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## ABSTRACT

Subdivision Surface provides an efficient way to represent free-form surfaces with arbitrary topology. Loop subdivision is a subdivision scheme for triangular meshes, which is  $C^2$  continuous except at a finite number of extraordinary vertices with  $G^1$  continuous [1]. In this paper we propose the Truncated Hierarchical Loop Subdivision Surface (THLSS), which generalizes truncated hierarchical B-splines to arbitrary topological triangular meshes. THLSS basis functions are linearly independent, form a partition of unity, and are locally refinable. THLSS also preserves the geometry during adaptive h-refinement and thus inherits the surface continuity of Loop subdivision surface. Adaptive isogeometric analysis is performed with the THLSS basis functions on several complex models with extraordinary vertices to show the potential application of THLSS [2].

## REFERENCES

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- [2] T. J. R. Hughes, J. A. Cottrell, Y. Bazilevs, Isogeometric analysis: CAD, finite elements, NURBS, exact geometry, and mesh refinement, *Computer Methods in Applied Mechanics and Engineering* 194 (2005) 4135-4195.