

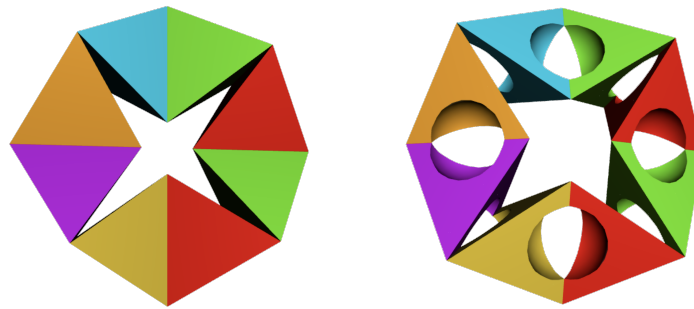
Sculptable Kaleidocycles: Visualizing Variable Cell Geometry

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Abstract

Kaleidocycles, a class of ring linkages, have long been depicted as compositions of ordinary tetrahedra. However, this paradigm only depicts one part of the picture; it has been adopted only for the mathematical and graphical facility it provides. There are infinitely many geometries which satisfy the parameters of a kaleidocyclic base unit (a “cell”). This paper aims to solidify that concept by improving visualization techniques for these “sculpted” kaleidocycles. To achieve this, ordinary kaleidocycles were first simulated in a mesh-driven environment, where their base cells were then sculpted through the use of computational solid geometry techniques. The results were intriguing new objects with artistic and mechanical implications. These articulations upon ordinary kaleidocycles allow further specialization and customizability of the mechanisms, improving their applicability to various tasks.



left: an ordinary kaleidocycle; right: a kaleidocycle sculpted by removing two spherical sectors from each cell