

Scaling Polygonal Modules for Equal Edge Lengths for Multimodular Origami Polyhedra and Tilings

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Abstract

This paper explores sizing a set of polygonal origami modules based on different regular polygons, with tabs and pockets, so that the edge lengths of all of the polygons are equal. This makes it possible to connect different shaped modules to make polyhedra and tilings. We call this type of origami multimodular origami.

As an example of scaling sizing, if a square of edge length e is folded into a module based on a regular polygon with edge length L , then doubling the size of the edges of the square and using the same folding sequence yield a module based on the same regular polygon with edge length $2L$. Our goal is to find starting sizes of edges of squares to use to fold different polygonal modules based on regular polygons so that modules of different polygons have the same edge length.

Below are computer generated images of a folded multimodular rhombicosidodecahedron made from 20 triangle, 30 square and 12 pentagon gyroscope modules, and a multimodular Gyroscoped Egg made from 2 square, 8 pentagon and 16 hexagon gyroscope modules based on a sizing of the modules. These models appear in “Multimodular Origami Polyhedra: Archimedean, Buckyballs and Duality”, Gurkewitz and Arnstein, Dover 2003. The images were created in Antiprism by Adrian Rossiter.

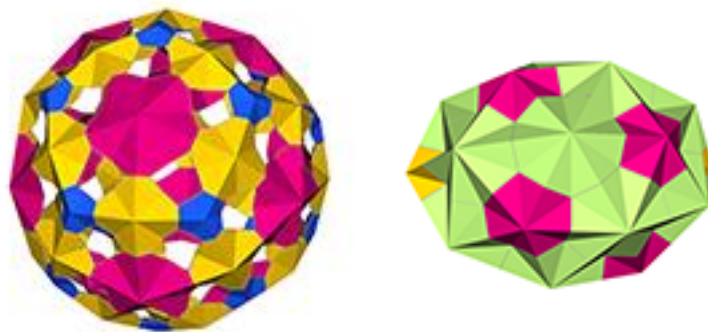


Figure 1: Multimodular Rhombicuboctahedron **Figure 2.** Multimodular Gyroscoped Egg