

Properties of a Class of Dihedral f -Tilings of the Sphere by Isosceles Triangles

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Abstract

A *spherical folding tiling* or *f-tiling* for short, is an edge-to-edge decomposition of the sphere by geodesic polygons, such that all vertices are of even valency and the sums of alternate angles around each vertex are π .

Spherical f -tilings are strongly related to the theory of isometric foldings initiated by S. Robertson in 1977. Here we give the complete description of the symmetry group and transitive properties of the set of a class of dihedral f -tilings by isosceles triangles. More precisely, we will consider the dihedral case of two non congruent isosceles triangles in a particular way of adjacency, see Figure 1. In this case, the class of f -tilings obtained is composed by two parameterised families, denoted by \mathcal{E}_α , $\alpha > \frac{\pi}{2}$ and $\mathcal{L}_{k,\alpha}$, $k \geq 3$, respectively and one isolated tiling, denoted by \mathcal{G} , see Figures 2, 3, 4.

Keywords: dihedral f -tilings, combinatorial properties, symmetry groups

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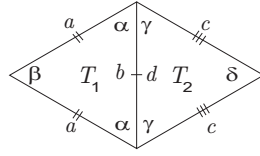


Figure 1: Adjacency of type I.

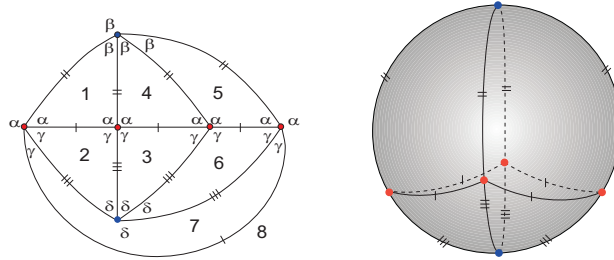


Figure 2: 2D and 3D representation of a member of \mathcal{E}_α .

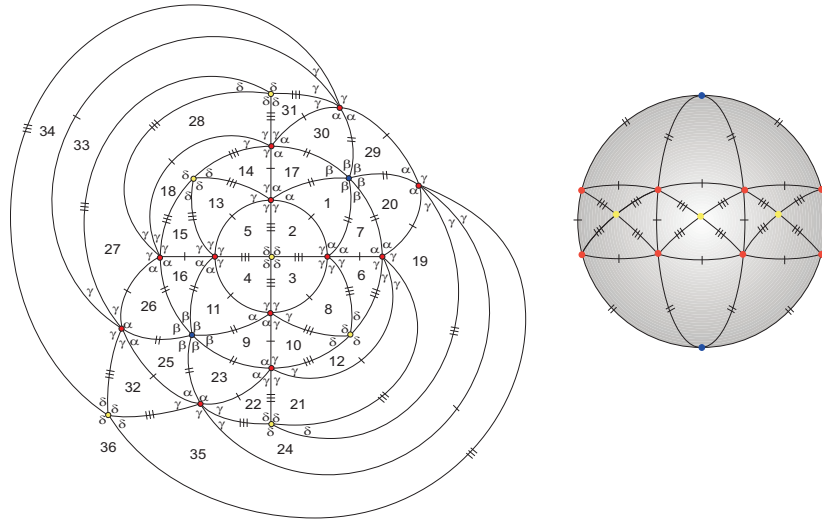


Figure 3: 2D and 3D representation of \mathcal{L}_3 .

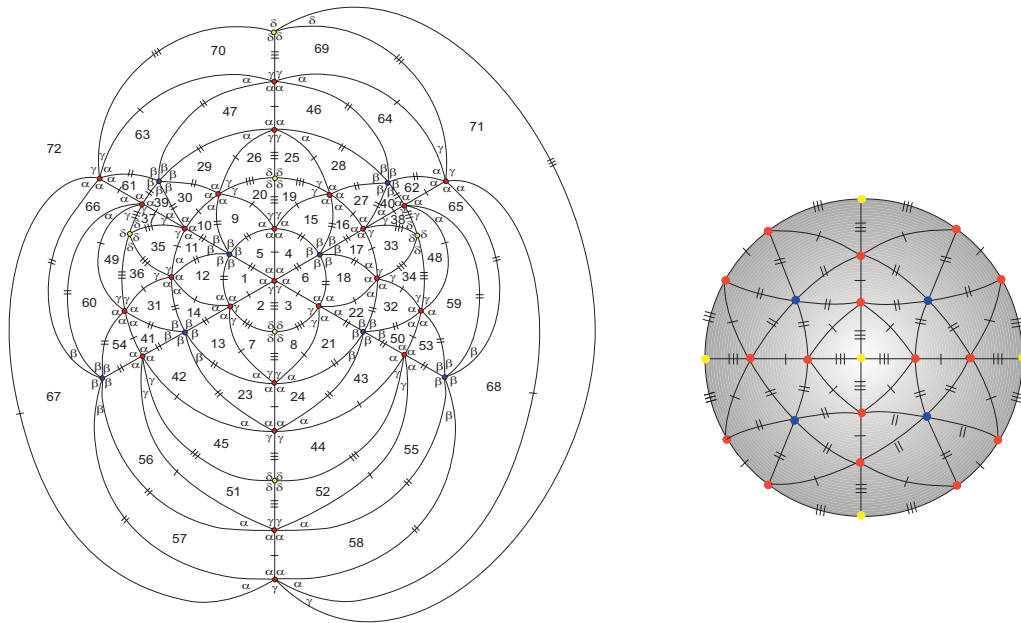


Figure 4: 2D and 3D representation of \mathcal{G} .