

1116-51-439

Robert J Lang* (robert@langorigami.com) and **Roger Alperin** (roger.alperin@sjsu.edu).
Counterrotating Twist Tessellations and Brocard Polygons.

Previous work by Lang and Bateman showed that a tiling of convex polygons could be converted to a flat-foldable origami tessellation via the “shrink-rotate” algorithm if and only if the tiling satisfied the Spiderweb condition, i.e., it possessed a non-crossing reciprocal diagram. In such origami tessellations, the twists all rotate the same direction, i.e., all clockwise or all counterclockwise.

There is another family of flat-foldable twist tessellations in which adjacent twists rotate in opposite directions. Such tessellations have been known in the origami world for many years, but no general algorithm has previously been described for their construction. In this work, we describe an algorithm for the construction of a general class of flat-foldable twist tessellations in which each tiling gives rise to a 2-D parameterized family of tessellations. We show that a sufficient condition for the existence of such a family is that each tile in the tiling is a cyclic Brocard polygon and show several new examples of such tessellations. (Received September 01, 2015)