Title: Bistable Auxetic Mechanical Metamaterials Inspired by Ancient Geometric Motifs

Link: `https://www.researchgate.net/publication/310476869_Bistable_Auxetic_Mechanical_Metamaterials_Inspired_by_Ancient_Geometric_Motifs`

Contributions

Fold patterns that make use of Resch tessellations. This pattern is similar to the pattern that is used in auxetics that use triangles for the building block. In this paper [1] they call this configuration a star tuck. Aside from this star tuck that makes use of triangles, there are also square and hexagonal patterns.

Limitations

Origami tessellations can also be used to make auxetics but they are time consuming in terms of manufacturing and assembly. Thf difficulties arise due to the fact that there are many intricate folds that needs to be performed.

Some folding patterns were not able to unfold from their 3D state, meaning that they were permanently 3D.

Future Directions

Varying the geometric properties of the unit cells to develop new designs which can be be used to make different kinds of structures. Optimizing surface deployability and places where vertices do not intersect.

Citations

References

[1] Tomohiro Tachi. Designing freeform origami tessellations by generalizing resch's patterns. *Journal of mechanical design*, 135(11), 2013.

Tag: tachi2013designing [1]