Abel, Zachary; Cantarella, Jason; Demaine, Erik D.; Eppstein, David; Hull, Thomas C.; Ku, Jason S.; Lang, Robert J.; Tachi, Tomohiro

Rigid origami vertices: conditions and forcing sets. (English) Zbl 1408.51018

Summary: We develop an intrinsic necessary and sufficient condition for single-vertex origami crease patterns to be able to fold rigidly. We classify such patterns in the case where the creases are pre-assigned to be mountains and valleys as well as in the unassigned case. We also illustrate the utility of this result by applying it to the new concept of minimal forcing sets for rigid origami models, which are the smallest collection of creases that, when folded, will force all the other creases to fold in a prescribed way.

MSC:
51M15 Geometric constructions in real or complex geometry
52C25 Rigidity and flexibility of structures (aspects of discrete geometry)

Keywords:
single-vertex origami crease patterns; rigid origami models

Full Text: DOI arXiv