Abstract Submitted
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Geometry in the mechanics of origami MARCELO A. DIAS, CHRISTIAN D. SANTANGELO, University of Massachusetts Amherst — We present a mechanical model for curved fold origami in which the bending energies of developable regions are balanced with a phenomenological energy for the crease. The latter energy comes into play as a source of geometric frustration, allowing us to study shape formation by prescribing crease patterns. For a single fold annular configuration, we show how geometry forces a symmetry breaking of the ground state by increasing the width of the ribbon. We extend our model to study multiple fold structures, where we derive geometrical constraints that can be written as recursive relations to build the surface from valley to mountain, and so on. We also suggest a mechanical model for single vertex folds, mapping this problem to an elastica on the sphere.

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