1050-52-78 **Gaiane Panina** (panina@iias.spb.su), Institute for Informatics and Automation, V.O. 14 line 39, StPetersburg, 199178, Russia, and **Ileana Streinu*** (istreinu@smith.edu), Computer Science Department, Smith College, Northampton, MA 01063. *Flattening single-vertex origami: the non-expansive case.*

A single-vertex origami is a piece of paper with a fold vertex placed in its interior or on its boundary, and straight-line rays called creases emanating from it. The Single-Vertex Origami Problem asks whether it is always possible to reconfigure the creased paper from any configuration compatible with the metric, to a flat position, in such a way that the paper is not torn, stretched and, for rigid origami, not bent anywhere except along the given creases. We settle the problem in the affirmative.

Previously, Streinu and Whiteley showed how the single-vertex origami problem reduces to the spherical Carpenter's Rule Problem, and solved the cases of open, less than π and closed, less than 2π spherical polygons using spherical expansive motions. The remaining case, presented here, cannot be solved only with non-expansive motions. Our motion planning algorithm works in a finite number of discrete steps, for which we give precise bounds depending on both the number of links and the angle deficit. (Received February 25, 2009)