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Miura Tubes and Assemblages: Theory and Applications EVGUENI FILIPOV, GLAUCIO PAULINO, University of Illinois at Urbana Champaign, TOMOHIRO TACHI, University of Tokyo — Origami systems inspired from the Miura-ori pattern are rigid and flat foldable meaning that they can fold completely by deforming only about prescribed fold lines. We investigate origami tubes and assemblages constructed from Miura-ori inspired sheets and use eigenvalue analyses to study their stiffness characteristics. A simplified bar model is used to model the stretching and shear of the flat panel segments and rotational hinges are used to simulate the bending stiffness of the panels and prescribed fold lines. We discuss the small to large deformation bending of thin sheets and show an improved method to estimate stiffness when modeling origami structures. The tube assemblages show interesting behaviors that make them suitable for applications in science and engineering.

> Evgueni Filipov University of Illinois at Urbana Champaign

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