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Combinatorial Origami PETER DIELEMAN, SCOTT WAITUKAITIS, MARTIN VAN HECKE, Leiden University, FOM Institute AMOLF — To design rigidly foldable quadrilateral meshes one generally needs to solve a complicated set of constraints. Here we present a systematic, combinatorial approach to create rigidly foldable quadrilateral meshes with a limited number of different vertices. The number of discrete, 1 degree-of-freedom folding branches for some of these meshes scales exponentially with the number of vertices on the edge, whilst other meshes generated this way only have two discrete folding branches, regardless of mesh size. We show how these two different behaviours both emerge from the two folding branches present in a single generic 4-vertex. Furthermore, we model generic 4-vertices as a spherical linkage and exploit a previously overlooked symmetry to create non-developable origami patterns using the same combinatorial framework.

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