Bistable Conjugate Minimal Surfaces

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Abstract

Multistability in shell structures is common both in nature and - sometimes unintentionally - in manmade structures. It can be induced in diverse geometries by material anisotropy, residual stresses, surface texturing and creasing. Modelling of such structures is challenging due to the need to account for both bending and stretching energy when exploring the available stable geometries and the transition between states. Here, we focus on minimal surfaces and their isometric transformations thus allowing us to focus our mathematical treatment on the bending energy variation. At the same time, we employ anisotropy to tune multistability for this category of geometries. We confirm our results through physical demonstrators.

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