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The mechanics of origami structures and shells

Abstract

It has recently become possible to pattern thin sheets to fold into 3D origami structures. These advances lead to many natural questions: can the geometrical constraints of hinged structures interfere with folding? What geometrical features determine the effective mechanical properties of origami? What is the relationship between origami, having discrete hinged plates, and smooth shells? In this talk, I will discuss these questions in the context of a model of the effective mechanics of origami structures and folded sheets. There is a surprising role for topology in some folded structures with no obvious analogue in smooth shells.