Abstract

Origami, an ancient art of paper folding, offers an efficient mapping between 2D and 3D geometries. Numerous research activities in the intersection of origami mathematics, computational geometry and smart materials have led to many innovative engineering designs in the past decade. However, a search of optimal designs for a specific engineering performance in a vast design space remains a challenge. This problem becomes particularly severe when the relationship between geometry and the underlying physics is complex. However, a systematic design method that can solve these inverse problems could guide us towards full utilization of a new design paradigm of reconfigurable 3D devices. A traditionally artistic origami design process can be reframed as a problem of finding an optimal material distribution for given design requirements. In this talk, origami design methods based on topology optimization for various problems including coupled structural and electromagnetic problems are discussed.

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