

Universal Force Responses for Constrained Euler Buckling

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Abstract

We investigate the packing of an Elastica in a rectangular cavity. We compute the horizontal and vertical forces applied by the cavity on the Elastica as a function of the size and aspect ratio of the cavity, as well as the excess length of the Elastica. We show that, despite the presence of several parameters, the packing forces, the bending energy, and the number of folds in the Elastica shape follow universal trends. Theoretical, numerical, and experimental results are compared and discussed.

Keywords:

structural mechanics buckling bifurcation