Elastica Constrained Between Walls

Jiayu Wang*†[1], Arnaud Antkowiak[2], and Sébastien Neukirch‡

[1]Institut Jean Le Rond d'Alembert – Institut Jean Le Rond d'Alembert, Sorbonne Université – France
[2]Institut Jean Le Rond d'Alembert (IJLRA) – CNRS : UMR7190, Université Pierre et Marie Curie (UPMC) - Paris VI – Boite 162 4 place Jussieu 75005 Paris, France

Abstract

In this study, we investigate the deformation of an Euler elastica confined between two walls under varying wall heights and end compression. We analyze the behavior of the elastica, focusing on the formation and structure of folds, the number of folds, and the forces involved, using multiple analytical and numerical methods. By comparing numerical simulations of the complete system with a simplified analytical model, we demonstrate that the simplified approach provides good predictions of the system's behavior.

*Speaker
†Corresponding author: jiayu.wang@sorbonne-universite.fr
‡Corresponding author: sebastien.neukirch@cnrs.fr