Configurational forces in elastic structures

Davide Bigoni[1], Francesco Dal Corso[2], Diego Misseroni[3]

Abstract

Configurational or Eshelby-like forces have been shown to emerge in elastic structures whenever a deformed configuration may change through a release of elastic energy [1]. This concept strongly influences buckling [2] and plays an important role in several problems involving deformation of an elastic rod, namely, 'self-encapsulation' [3] and 'injection' [4]. Moreover, configurational forces are the key factor in the design of the elastica arm scale [5] and of the torsional actuator [6].
Configurational forces will be shown to be present during snake locomotion and will be shown to be strongly dependent on the variation of the bending stiffness along the snake body. Other examples of configurational forces arising in different mechanical problems will be finally highlighted.

Acknowledgment

The authors would like to thank financial support from the ERC advanced grant ERC-2013-ADG-340561-INSTABILITIES

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[1]Department of Civil, Envr & Mechanical Engineering University of Trento, Via Mesiano 77, 38123, Trento, Italy, e-mail : davide.bigoni@unitn.it
[2]Department of Civil, Envr & Mechanical Engineering University of Trento, Via Mesiano 77, 38123, Trento, Italy, e-mail : francesco.dalcorso@unitn.it
[3]Department of Civil, Envr & Mechanical Engineering University of Trento, Via Mesiano 77, 38123, Trento, Italy, e-mail : diego.misseroni@unitn.it

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