

The dynamics of structures with configurational forces

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The concept of configurational force goes back to the work of Eshelby [1] and has been recently extended to elastic structures subject to constraints which allow a configurational change [2]. The same concept is shown to apply to torsional locomotion [3] and to a model of snake locomotion involving an elastic rod free of sliding in a frictionless and rigid channel [4]. Experimental evidence and theoretical calculations will be presented for the case of a rod constrained by a sliding sleeve and subject to a sudden application of a dead load. It will be shown that configurational forces play an important role in the nonlinear dynamics of structures. Interestingly, initial configurations are found for which the configurational force induces a behavior in which the structure becomes a nonlinear oscillator.

References

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