POLITECNICO DI TORINO

DISMA Dipartimento di Scienze Matematiche G. L. Lagrange

ECCELLENZA 2018 • 2022

Thursday, October 17, 2019 at 10:30
Politecnico di Torino, DISMA, Aula Buzano (third floor)

Paolo GIDONI

Postdoctoral researcher at Czech Academy of Sciences

An introduction to the modelling of soft crawling locomotors

Dr Marco Morandotti introduces the seminar

Abstract

The inclusion of elastic components in the modelling and design of biomimetic crawlers endows these systems with new compliance capabilities, but at the same time raises additional challenges to the analysis of their locomotion properties.

The mathematical theory of rate-independent systems and sweeping processes provides an effective framework to address such issues. Indeed, the various strategies adopted by crawlers to achieve locomotion, such as friction anisotropy, complex shape changes and control on the friction coefficients, can be effectively described in terms of stasis domains.

The aim of this talk is to provide, with the aid of representative toy models, an essential introduction to the modelling of rate-independent soft crawlers. On one hand we show how Calculus of Variations provides a useful toolkit to the analysis of such systems; on the other hand we highlight how the differences between a mechanical systems guided by active external forces and soft self-propelled locomotors raise new mathematical challenges.

Biography

Paolo Gidoni obtained his PhD in Mathematical Analysis in 2016 at SISSA – International School for Advanced Studies in Trieste, where he also attended the Master in Complex Actions. Previously he did his Bachelor's and Master's studies in Mathematics at the University of Udine, where he also was a student of the Scuola Superiore of the University. After the PhD, Paolo first was a postdoc at the CMAF-CIO of the University of Lisbon. Afterwards, he held a fellowship by the National Institute of Higher Mathematics (I.N.d.A.M), in the framework of the Math-tech–CNR–INdAM project, which he carried out at the Department of Mathematics of the University of Padova. Since June 2019 he is a postdoctoral researcher at the Institute of Information Theory and Automation of the Czech Academy of Sciences, in the Department of Decision-Making Theory.

Save the date for the next event: October 22, 2019
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