

CICLO DE SEMINARIOS 2012

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“A Geometric Approach to Computation of Elastica in Contact ”

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Computer Graphics and Animation applications require mathematical models and simulation software that captures the qualitative, characteristic behavior of a physical system, even at very coarse discretizations. Our research group develops such numerical tools by using ideas from discrete differential geometry and discrete geometric mechanics. We attempt to build a discrete picture from the ground up, mimicking the axioms, structures, and symmetries of the smooth setting. The result is a discrete (hence immediately computable) model of the system, and in particular one that preserves important symmetries and conservation laws.

I will briefly survey our work in this domain, and focus on two specific recent examples: a discrete model of elastic rods with a natural extension to viscous threads, and a computational treatment of mechanical systems under contact and multi-impact (e.g., crumpling thin shells, granular media). Even at coarse discretizations, the resulting simulations capture desirable phenomena such as good long-time energy conservation, energy exchange between coupled modes, and characteristic instabilities.



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