RUHR-UNIVERSITÄT BOCHUM

FAKULTÄT FÜR MATHEMATIK

RUB

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Oberseminar Dynamische Systeme

The N-centre problem on Riemannian surfaces: a variational approach

Dienstag, 09. Mai 2023
16:15 Uhr – Raum IA 1/181

Gian Marco Canneori
(Turin)

Abstract:

The classical N-centre problem of Celestial Mechanics describes the behaviour of a point particle under the attraction of a finite number of motionless bodies. Considered as a limit case of a (N+1)-body problem, it has been the object of several results concerning integrability, investigation of chaos and existence of periodic orbits, mostly when the motion is constrained to the Euclidean plane. In particular, variational approaches are convincing in this situation and have produced classes of collision-less periodic solutions, after imposing topological constraints of different natures.
Looking for genuine solutions of second order differential equations, the most delicate step resides in avoiding collisions with the centres. Picturing a more realistic situation, a natural extension of these results could be the one in which the motion is constrained to a prescribed Riemannian surface. In this talk we state the N-centre problem on orientable surfaces and we show how it is possible to use variational arguments in order to produce collision-less periodic solutions. Such trajectories will be found among homotopy classes of loops, and their variational and topological properties will be described. This is a joint work with Stefano Baranzini.

Guests are very welcome!