## Abstract

The *n*-centre problem is a limiting case of the classical *n*-body problem, where a test particle moves under the gravitational influence of a finite number of motionless heavy centres  $c_1, \ldots, c_n$ . In this talk, I will present a generalised version of the *n*-centre problem, where the dynamics takes place on a Riemannian surface (M, g). I will then construct a family of periodic solutions in distinct homotopy classes that avoid collisions with the centres.

As a result, I will identify an invariant set for the system that is semiconjugated to the Bernoulli shift. I will further determine some situations in which the topological relation is actually a pure conjugation, so that a chaotic map acts on the invariant set. Beyond the classical Euclidean setting, this occurs, for instance, when the curvature of g is negative and the mechanical energy is above some positive threshold.

These results are part of a joint work with Stefano Baranzini.