Hamiltonian Monodromy: Dynamical Systems and Physics

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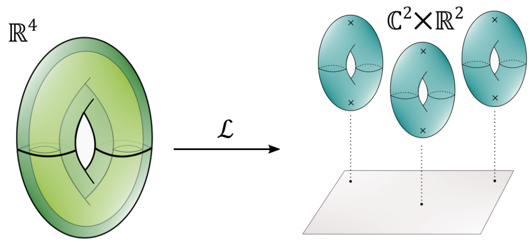
When we study a physical phenomenon that can be described by classical mechanics, must of the time we work with Hamiltonian differential equations. In the study of Hamiltonian systems there is a special kind called completely integrable systems which have a nice topological structure on the phase space. This structure gives a local change of coordinates, called action-angle coordinates, which transforms the flow of the system to a linear flow over invariant tori. Hamiltonian monodromy is the simplest topological obstruction to the existence of global action-angle coordinates.

In this talk, I will introduce, in $\mathbb{R}^4$, all of the concepts that were mentioned in the previous paragraph in a geometric way. Then, I will explain how, using spectral Lax pairs, one can introduce a Riemann surface such that the computation of Hamiltonian monodromy boils down to the computation of a residue at infinity of a meromorphic form defined over this Riemann surface.



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[1] G.J. Gutierrez Guillen, P. Mardesic, D. Sugny, *Hamiltonian Monodromy via Spectral Lax Pairs*, pre-print: https://arxiv.org/abs/2112.15325

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