

“In almost all textbooks, even the best, this principle is presented so that it is impossible to understand.” (K. Jacobi) I do not choose to break with tradition.

—Vladimir Arnol’d in *Mathematical Methods of Classical Mechanics*

# THE TRIVIAL NOTIONS SEMINAR

**Alejandro Epelde Blanco**

will speak on

**The Arnol’d–Liouville theorem**

## ABSTRACT

A Hamiltonian dynamical system with  $n$  degrees of freedom is said to be *integrable* if it admits  $n$  Poisson commuting independent integrals of motion. The Arnol’d–Liouville theorem states that if the energy level sets are compact, one can find a system of canonical (in the sense of Darboux) action-angle coordinates  $(a_i, \alpha_i)$  such that the Hamiltonian is a function of the  $a_i$  only and the dynamics reduce to quasiperiodic motion in Lagrangian tori. I will go over the symplectic geometry involved in giving a proof of the theorem and discuss the concrete example of the spherical pendulum, a good example of an integrable system exhibiting non-trivial global behaviour.

**Friday, September 23, 2022**

**at 12pm**

**Science Center, Room 232**