Abstract:

Classical mechanics consists of three parts: Newtonian, Lagrangian, and Hamiltonian Mechanics. Each part has explicit symmetries (the explicit Laws of Motion), which in turn generate implicit, or hidden symmetries (like the Law of Conservation of Energy, etc.).

In the Master Thesis defense, different types hidden symmetries will be considered. They are reflected in the Noeter Theorem and the Poincare Recurrence Theorem, respectively. The Poincare Recurrence Theorem is also applicable to some number theory problems, which can be considered as dynamical systems. The problem “The first digits of the powers of integers” will be considered in the talk, and some hidden symmetries, like circle and tori rotations, as well as hidden arithmetic progressions in the set of all the exponents, will be established.