

IPM Mathematics Seminar Series

An Introduction to Hyperbolic Dynamics

Speakers: Meysam Nassiri, Zahra Reshadat and Mojtaba Zareh Bidaki

Schedule: Wednesdays, 9:00 AM

Venue: IPM - Niavaran - Tehran

Program Overview

This seminar series will focus on the geometric aspects of dynamical systems, offering an intuitive and rigorous introduction to key ideas in hyperbolic theory. Hyperbolic dynamics is one of the central topics in modern dynamical systems, providing a deep understanding of chaotic behavior, stability, and long-term evolution of systems in mathematics and physics. It plays a fundamental role in diverse areas, from geometry and topology, to celestial mechanics, fluid dynamics and statistical mechanics. The theory provides powerful geometric tools to study stability and bifurcations in dynamical systems, making it a cornerstone of modern mathematical research. The key topics covered include:

- *Uniform hyperbolicity*
- *Partially hyperbolic dynamics*
- *Smooth ergodic theory*

The series is designed for undergraduate and graduate students interested in geometrical and topological aspects of dynamical systems. A basic understanding of manifolds and topology is required. Ergodic theory is not assumed at the first part of the lectures. In the second part, we will use basics of *Ergodic Theory* (participating in the course on Ergodic Theory currently being held at Sharif University by Dr. Talebi is recommended).

References

- *Introduction to Dynamical Systems* – M. Brin, G. Stuck.
- *Dynamics Beyond Uniform Hyperbolicity* – C. Bonatti, L. Díaz, M. Viana,
- *Introduction to the Modern Theory of Dynamical Systems* – A. Katok, B. Hasselblatt,
- *Introduction to Smooth Ergodic Theory* – L. Barreira, Y. Pesin.

First session: 1st Esfand 1403.

For further details, please contact mojtabazare@ipm.ir.