



Faculty of Mathematics and Computer Science
The Weizmann Institute of Science

Distinguished Lecturer Series

Sponsored by the Arthur and Rochelle Belfer Institute of Mathematics and Computer Science
and by
the Amir Pnueli Visiting Scholar Program in Computer Science and Applied Mathematics

Yakov Pesin

The Pennsylvania State University

Title:

The Theory of Chaos: Yesterday, Today and Tomorrow

Abstract: The talk is a brief historical account of the development of the theory that deals with the phenomenon widely known as "deterministic chaos" -- the appearance of irregular chaotic motions in purely deterministic dynamical systems on compact phase spaces. This phenomenon is considered to be one of the most fundamental discoveries in the theory of dynamical systems in the second part of the last century. It is due to instability of trajectories of the system that drives orbits apart, while compactness of the phase space forces them back together. The consequent unending dispersal and return of nearby trajectories is one of the hallmarks of chaos.

The hyperbolic theory of dynamical systems provides a mathematical foundation for that paradigm and thus serves as a basis for the theory of chaos. The hyperbolic behavior can be interpreted in various ways and the weakest one is associated with dynamical systems with non-zero Lyapunov exponents.

I will describe various types of hyperbolicity, outline some examples of systems with hyperbolic behavior and discuss the still-open problem of whether chaotic dynamical systems are generic. This genericity problem is closely related to two other important problems in dynamics on whether systems with non-zero Lyapunov exponents exist on any compact phase space and whether chaotic behavior can coexist with a regular (non-chaotic) one in a robust way.

Lecture Hall, Room 1, Ziskind Building

Tuesday, 19 February 2013

11:00

Refreshments will be served in room 141 after the talk