Department of Mathematics, BGU

Colloquium

On *Tuesday, May ,7 2019*

At *14:30 − 15:30*

In *Math 101-*

Jean-Pierre Conze (University of Rennes)

will talk about

Stationary random walks: recurrence, dffiusion, examples, billiards

Abstract: The billiards in the plane with periodic obstacles are dynamical systems with a simple description but intricate features in their behavior. A specfiic example, introduced by Paul and Tatania Ehrenfest in ,1912 is the so-called "wind-tree" model, where a ball reduced to a point moves on the plane and collides with parallel rectangular scatters according to the usual law of geometric optics.

Natural questions are: does the ball return close to its starting point (recurrence), how fast the ball goes far from it? (dffiusion), what is the set of scatters reached by the ball?

These billiards can be modeled as dynamical systems with an infinite invariant measure. The position of the particle can be viewed as a stationary random walk, sum of a stationary sequence of random variables with values in R^2, analogous to the classical random walks. For the billiard the increments are

the displacement vectors between two collisions, while for the classical random walks the increments are independent random variables.

In the talk, after some general facts about systems with infinite invariant measure, the notions of recurrence and growth (or dffiusion) of a stationary random walk will be illustrated by examples, in particular the "wind-tree" model.