Department of Mathematics, BGU

BGU Probability and Ergodic Theory (PET) seminar

On *Thursday, December ,1 2022*

At *11:10 – 12:00*

In *101-*

Mélodie Andrieu (Bar-Ilan University)

will talk about

Remarkable symbolic dynamical systems associated with some multidimensional continued fraction algorithms

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Remarkable symbolic dynamical systems associated with some multidimensional continued fraction algorithms

Abstract: To the [regular] continued fraction algorithm, which consists of the infinite iteration of the Farey map:

$$(x,y) \mapsto \begin{array}{ll} (x-y,y) & \text{if } x \geq y, \\ (x,y-x) & \text{otherwise,} \end{array}$$

is associated a remarkable class of symbolic dynamical systems, called *Sturmian subshifts* (1940). Let's recall that a symbolic dynamical system – or subshift – is a close set of infinite sequences valued in a finite set, stable under the shift map $S : (u_n) \to (u_{n+1})$. Sturmian subshifts enjoy numerous combinatorial and geometrical interpretations. Noticeably :

- they are exactly the aperiodic subshifts valued in {0,1} with *imbalance* equal to 1;
- they are exactly the discretizations of straight lines with an irrational slope;
- they are codings of irrational rotations of the circle with respect to remarkable partitions (often referred to as "natural codings").

Since the work of Jacobi, several algorithms have been proposed to generalize the continued fraction to triplets of positive numbers. They are expected to yield good and simultaneous diophantine approximations of pairs of numbers, or, dually, to discretize planes. One general question is: do the classes of symbolic dynamical systems associated with these algorithms enjoy similar characterizations to Sturmian subshifts?

In this talk, I will present two results I obtained for Arnoux-Rauzy (1991) and Cassaigne-Selmer (2017) multidimensional continued fraction algorithms.