Department of Mathematics, BGU

BGU Probability and Ergodic Theory (PET) seminar

On *Thursday, January ,6 2022*

At *11:10 – 12:00*

In *Building ,34 room 14*

Nadav Ben-David (Ben-Gurion University)

will talk about

The Ramanujan Machine: Polynomial Continued Fraction and Irrationality Measure

Abstract: Apéry's proof of the irrationality of ζ(3) used a specfiic linear recursion that formed a Polynomial Continued Fraction (PCF). Similar PCFs can prove the irrationality of other fundamental constants such as and e. However, in general, it is not known which ones create useful Diophantine approximations and under what conditions they can be used to prove irrationality. Here, we will present theorems and general conclusions about Diophantine approximations created from polynomial recursions. Specfiically, we generalize Apéry's work from his particular choice of PCF to any general PCF, finding the conditions under which a PCF can be used to prove irrationality or to provide an efficient Diophantine approximation. We further propose new conjectures about

Diophantine approximations based on PCFs. Our study may contribute to ongoing efforts to answer open questions such as the proof of the irrationality of the Catalan constant or of values of the Riemann zeta function (e.g., $\zeta(5)$).

Please Note the Unusual Place!