

Department of Mathematics, BGU

BGU Probability and Ergodic Theory (PET) seminar

On Tuesday, May, 1 2018

At 11:00 – 12:00

In 201

Chen Dubi (BGU)

will talk about

Limit theorems for a counting process with extendable dead time (Type II counter)

Abstract: Measuring occurrence times of random events, aimed to determine the statistical properties of the governing stochastic process, is a basic topic in science and engineering, and has been the topic of numerous mathematical modeling techniques. Often, the true statistical properties of the random process deviate from the measured properties due to the so called “dead time” phenomenon, defined as a time period after a reaction in which the detection system is not operational. From a mathematical point of view, the dead time can be interpreted as a rarefied series of the original time series, obtained by removing all events which are within the dead time period inflicted by previous events.

When the waiting times between consecutive events form a series of independent identically distributed random variables, a natural setting for analyzing

the distribution of the number of event- or the event counter- is a renewal process. In particular, for high rate measurements (or, equivalently, large measurement time), the limit distribution of the counter is well understood, and can be described directly through the first two moments of the waiting time between consecutive events.

In the talk we will discuss limit theorems for counters with paralyzing dead time (type II counter), expressed directly through the probability density function of the waiting time between consecutive events. This is done by writing explicit formulas for the first and second moments of a waiting time distribution between consecutive events in the rarefied process, in terms of the probability density function of the waiting of the original process.