Department of Mathematics, BGU

OA/OT Seminar

On *Tuesday, January ,21 2020*

At *11:00 – 12:00*

In *101-*

Motke Porat (BGU)

will talk about

Realizations of non-commutative rational functions

Abstract: The theory of non-commutative (nc) rational functions which are regular at 0 is well known and studied, in terms of their minimal realizations: any such function admits a unique minimal realization centred at 0 and the domain of the function coincides with the invertibility set of the (resolvent of the) realization. In addition, a nc power series around the origin will be the power series expansion of a nc rational function fi and only fi a given Hankel matrix built from the coefficients of the given power series has a finite rank (Fliess-Kronecker).

In this talk, we present generalizations of these ideas to the case where the centre is non-scalar. In particular, we prove the existence and uniqueness of a minimal Fornasini-Marchesini realization for every nc rational function, centred at an arbitrary matrix point in its domain of regularity, and show that using this realization, one can evaluate the function on all of its domain (of matrices of all sizes).

Unlike the case of a scalar centre, the coefficients of the realization can not be chosen arbitrarily. We present necessary and sufficient conditions (called the linearized lost-abbey conditions) on the coefficients of a minimal realization centred at a matrix point, such that there exists a nc rational function which admits the realization.

This is a joint work with Victor Vinnikov.

Please Note the Unusual Time!