Positivity Seminar

4 June 2010, 15:30 METU

Quantum positivity

Anar Dosi

Middle East Technical University Northern Cyprus Campus, Guzelyurt, KKTC
dosiev@metu.edu.tr

One of the fundamental concepts of quantum functional analysis is the matrix (or complete) positivity. In the general case of local operator systems [3], [2] we have local matrix positivity instead of the global one. The local positivity has quite different nature with respect to the (global) positivity considered in the normed quantum functional analysis. Roughly speaking it is a "very local" concept to be represented as something classical. Our investigation in the duality theory [5] (see also [4]) of quantum cones allows us to find out a suitable language to handle the problem. It is a new structure, so called quantum order, which deals with a filter base of quantum cones. A quantum order in turn generates a quantum topology. In the present talk we propose an abstract characterization of the local operator systems that would keep free us from being forced to treat the local operator systems as unbounded operators. We generalize the known [1] result by Choi-Effros on abstract characterization of operator systems. The known [6] Paulsen's tricks used in the normed case were played central roles in our approach. The main result of the talk asserts that each quantum system can be realized as a concrete quantum L^∞-system up to a quantum order isomorphism.

References.

1. Choi M.D., Effros E.G., Injectivity and operator spaces, J. Functional Anal., 24 (1977) 156-209.

2. Dosiev A. A., *Quantized moment problem,* Comptes Rendus Math. 344 (1) (2007) 627-630.

3. Dosiev A. A., *Local operator spaces, unbounded operators and multinormed C^*-algebras,* J. Funct. Anal., 255 (2008) 1724–1760.

4. Dosi A.A., *Local operator algebras, fractional positivity and quantum moment problem,* Trans. AMS (2010) (to appear).

5. Dosi A.A., *Quantum duality, unbounded operators and inductive limits,* J. Math. Physics (2010) (to appear).

6. Paulsen V., Completely bounded maps and operator algebras, Cambridg Univ. Press (2002).