Special lectures for PhD students

Institute of Mathematics Polish Academy of Sciences within SSDNM

April 7 – 11, 2014

Prof. Michael Megrelishvili

(Bar-Ilan University, Israel)

Banach representations of dynamical systems

Day	hours	room
Monday,7	09.30–10.45 11.00–12.00	321 IMPAN
Tuesday, 8	15.00-16.15 16.30-17.30	321 IMPAN
Wednesday, 9	12.30-13.45 14.45-15.45	321 IMPAN
Thursday, 10	11.15-12.30 13.45-14.45	321 IMPAN
Friday, 11	10.15-11.30 11.45-12.45	321 IMPAN

Summary

Like topological groups, compact dynamical systems, can be represented on Banach spaces. In the present course we investigate some hierarchies of topological dynamical systems and topological groups coming from Banach space theory. This allows to find new links between many different research lines. Among others: abstract topological dynamics, geometry of Banach spaces and the theory of Polish topological groups.

We study dynamical analogs of Eberlein, Radon-Nikodým and weakly Radon-Nikodým compacta; that is the classes of dynamical systems which can be represented on reflexiive, Asplund and Rosenthal Banach spaces. They correspond to important classes of compact metrizable dynamical systems: weakly almost periodic (WAP), hereditarily nonsensitive (HNS) and tame.

This approach naturally extends some classical research themes and at the same time opens new and sometimes quite unexpected directions. One of the examples is a connection between the lack of chaotic behavior (lack of "butterfly effects") of a dynamical system (HNS systems) and the existence of weak-star continuous representations on the dual of Asplund Banach spaces. The topological concept of the *fragmentability* (originally coming from Banach spaces) and the famous factorization theorem of Davis-Figiel-Johnson-Pelczyński are the main tools in the present theory.