

Lectures take place at the Institute of Mathematics and Statistics, No.8 building within the Faculty of Science, Kotlarska 2, Brno

Wednesday, April 20, 2016, at 4:00 p.m. in M1

John Denis Bourke, PhD.

Higher Groupoids

Abstract:

Groupoids lie between groups and categories. Extending the fundamental group construction, each topological space gives rise to a fundamental groupoid of points and paths. There are higher fundamental groups (the homotopy groups) and, correspondingly, higher dimensional groupoids. These are well understood up to dimension three but not beyond: in particular, various definitions of infinity-groupoid have been given but the relationship between the different definitions remains poorly understood.

One of the first definitions of infinity-groupoid was proposed by Alexander Grothendieck who, in a famous letter to Daniel Quillen, used it to formulate the so-called homotopy hypothesis, still unproven. I will tell the story of Grothendieck's infinity groupoids and discuss some recent work on these structures, including my own.

Wednesday, March 23, 2016, at 4:00 p.m. in M1

prof. RNDr. Roman Šimon Hilscher, DSc.

Principal and antiprincipal solutions at infinity for nonoscillatory linear Hamiltonian systems

Abstract:

In this talk we will discuss the theory of principal and antiprincipal solutions at infinity for nonoscillatory linear Hamiltonian systems. Principal solutions are in a certain sense the smallest solutions of the system at infinity. A key new ingredient is that we do not assume the complete controllability (or identical normality) of the system. We show how to define the principal solutions at infinity for this more general case and that the principal and antiprincipal solutions can have their rank equal to any integer value in an explicitly given range. The smallest rank corresponds to the unique minimal principal solution at infinity, while the largest

rank corresponds to the traditional maximal (i.e. invertible) principal and antiprincipal solutions at infinity. We shall comment on some applications of the principal solutions at infinity for controllable systems in the oscillation and spectral theory and seek for such applications in the abnormal case. This talk is based on a joint work with Peter Šepitka.