Analysis on Quantum Tori

Speaker: Quanhua Xu, Universite de Franche-Comte and Harbin Institute of Technology

Time: 1:30 pm - 2:30 pm, Thursday, November 7, 2019

Venue: Room 264, Geography Building, Zhongbei Campus, ECNU

Abstract

Quantum tori are fundamental examples in operator algebras and noncommutative geometry. Their algebraic and geometric aspects have been well understood. However, the study on their analytic aspect has been started only recently. This talk will give a brief survey of the recent development on analysis on quantum tori. We will present two families of results: the first one concerns the convergence of Fourier series, and the second deals with the embedding and characterizations of Sobolev and Besov spaces. As application to noncommutative geometry, we will discuss the very recent results of Sukochev et al on Connes' quantized differential calculus on quantum tori.

Biography

Professor Quanhua Xu is a senior member of the “Institut Universitaire de France” and professor of exceptional class in mathematics at University of France-Comté in France. He got his PhD from University of Paris VI in 1988. He worked mainly on harmonic analysis and Banach spaces. Xu has made far-reaching contributions to the founding of the modern theory of noncommutative martingale inequalities. His two most important contributions are the Burkholder-Gundy inequalities and the Burkholder-Rosenthal inequalities for noncommutative martingales, obtained in collaboration with G. Pisier and M. Junge, respectively. Together with Junge, he has invented an important technique, which is of a quantum probabilistic nature and involves Orlicz spaces. It is a powerful tool for dealing with many subjects in operator spaces such as completely p-summing maps, injectivity and exactness constants. Xu has for the first time established the vector-valued Littlewood-Paley-Stein theory for evolution semigroups, closely connected to the geometry of Banach spaces. He is now the director of the Institute for advanced study in Mathematics of Harbin Institute Technology. He has been awarded a 1000-talent program in 2010.