Groupoid Crossed Products

a Thesis Defense
by

Geoff Goehle

Tuesday May 26, 2009
Carson L01, 2:00PM

Abstract

We present a number of findings concerning groupoid dynamical systems and groupoid crossed products. The primary result is an identification of the spectrum of the groupoid crossed product when the groupoid has continuously varying abelian stabilizers and a well behaved orbit space. In this case, the spectrum of the crossed product is homeomorphic, via an induction map, to a quotient of the spectrum of the crossed product by the stabilizer group bundle. The main theorem is also generalized in the groupoid algebra case to an identification of the primitive ideal space. This generalization replaces the assumption that the orbit space is well behaved with an amenability hypothesis. We then use induction to show that the primitive ideal space of the groupoid algebra is homeomorphic to a quotient of the dual of the stabilizer group bundle. In both cases the identification is topological. We then apply these theorems in a number of examples, and examine when a groupoid algebra has Hausdorff spectrum. As a separate result, we also develop a theory of principal groupoid group bundles and locally unitary groupoid actions. We prove that such actions are characterized, up to exterior equivalence, by a cohomology class which arises from a principal bundle. Furthermore, we also demonstrate how to construct a locally unitary action from a given principal bundle. This last result uses a duality theorem for abelian group bundles which is also included as part of this thesis.

This talk should be accessible to graduate students.