

Fall 2008

Groupoids Seminar

Course: Math 260-011**Time:** Thursday 9:40 – 11:00 am**Place:** Surge 268**Organizer:** Aviv Censor

A groupoid can intuitively be regarded as a set with a partially defined multiplication, for which the usual properties of a group hold whenever they make sense. Every group is of course a groupoid, but there is a wide variety of naturally occurring groupoids which are not groups. For example, an equivalence relation R on an arbitrary set X is a groupoid: the groupoid elements are pairs (x, y) where $x \sim y$, the partially defined product is given by $(x, y)(y, z) = (x, z)$ and the inverse is given by $(x, y)^{-1} = (y, x)$. Another useful way to think of the algebraic properties of a groupoid is to view it as a (small) category in which every morphism is invertible.

Groupoids often carry further topological and measure-theoretic structures, and equipped with these they form a rich field of mathematics. Since being first introduced by Brandt in 1926, groupoids have appeared in a wide range of areas in mathematics, physics and beyond. They play important roles in differential geometry, algebraic topology, operator algebras, noncommutative geometry, and more.

Despite the above, and in contrast to groups, groupoids are still not so well-known, even to those using groupoids in their own specialty. Not many consider themselves as groupoid theorists. In fact, groupoid terminology itself is far from determined. For example, even the notion of a subgroupoid is not uniquely defined in the literature.

The purpose of this seminar is to get familiar with groupoids, through theory and examples. During the first few weeks, we will overview the subject starting from the elementary definitions. Further into the quarter we will look more closely into groupoids as they appear in various applications, according to the interest of the participants. The seminar will lead up to Groupoidfest, an annual workshop which will take place this year here at UCR, on November 22-23, 2008.

Graduate students and Faculty are warmly invited to participate!