Temple University Mathematics Colloquium

Thomas Zaslavsky

Binghamton University of SUNY

will speak on

The Associative Law in Multary Quasigroups

A **multary** (or n-ary) **quasigroup** is a set with a multary operation, $f : Q^n \to Q$, such that, given any n of the variables in the expression $f(x_1, ..., x_n) = x_0$, the last variable is uniquely determined. Such an operation is like a group operation but with many arguments and without an analog of associativity. Multary quasigroups were introduced by Belousov and Sandik in 1966, coming from the viewpoint of universal algebra.

A basic question is whether a given f is essentially n-ary or is compounded of smaller multary quasigroups. This is a kind of associativity or factorization. For instance, one way to construct a multary quasigroup is to iterate a (binary) group operation. An iterated group has all possible factorizations, and a result of Belousov and his school was that, if f has all possible factorizations, then it is essentially an iterated group.

In general, f has a graph of factorizations, $G(f)$, which may not be the complete graph. Belousov conjectured that, if $G(f)$ is 3-connected, then it is complete. I will outline a proof based on the theory of biased expansion graphs. (A biased expansion of a graph is a kind of branched covering graph.)

Monday, March 21, 2005
Lecture at 4:00 PM ($\sharp$)
Coffee, tea, and refreshments from 3-5 PM.
Room 617, Wachman Building
Department of Mathematics