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Algebra of Tutte Functions

Abstract for the Combinatorics and Algebra Seminars 2005 September 20

The *Tutte polynomial*, and a kind of generalization that involves arbitrary parameters, have become famous recently due to connections with knot invariants and statistical physics. The exact form of the generalization is not fully understood. I will talk about one aspect of this, namely, the classification problem for parametrized weak Tutte functions, which are the natural generalization of the parametrized Tutte polynomial.

A *parametrized weak Tutte function* (of matroids) is a function that satisfies a linearity relation of the form
$f(M) = d_e f(M\backslash e) + c_e f(M/e)$
for "most" elements of a matroid M on ground set E. M\e and M/e are matroids on ground set E\e called, respectively, the deletion of e and the contraction of e. The quantities d_e and c_e (belonging to some commutative ring) are called the *parameters*. Consider an arbitrary class *C* of matroids such that every deletion and contraction of a matroid in *C* is also in *C*. The problem is to find all parametrized weak Tutte functions defined on *C*. The first step is to set up the universal module for parametrized weak Tutte functions and relate it to the universal algebra for parametrized strong Tutte functions (weak functions that satisfy an additional, multiplicative rule).

I will define a matroid and explain the universal Tutte module and algebra.

This is joint work with Joanna Ellis-Monaghan.
