Matroids from vector spaces

James Oxley
Louisiana State University

October 29, 1998
102 Bradley Hall, 4:00 pm
(Tea 3:30 pm Math Lounge)

Abstract

Matroids were introduced by Hassler Whitney in 1935 in his paper "On the abstract properties of linear dependence". Whitney defined a matroid $(E, \mathcal{I})$ to be a finite set and a non-empty hereditary collection $\mathcal{I}$ of subsets of E such that if I and J are in $\mathcal{I}$ and $|I| < |J|$, then $I \cup \{j\}$ is in $\mathcal{I}$ for some j in $J - I$. Matroids arise naturally in numerous algebraic and combinatorial contexts. In particular, if E is any finite subset of a vector space V over a field F and $\mathcal{I}$ is the collection of linearly independent subsets of E, then $(E, \mathcal{I})$ is a matroid. Such a matroid is called F-representable and much of the focus of matroid theory has been directed towards characterizing such matroids for certain particular choices of the field F. This talk will survey results in this area culminating with some exciting recent developments.

This talk should be accessible to graduate students.