

Graph Theory Seminar
3pm Wednesday December 3rd
Hume 331

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Signed Graphs and Their Matroids

A matrix over \mathbb{Q} is *totally unimodular* if every square submatrix has determinant 0, 1, or -1 . Totally unimodular matrices are of fundamental importance in integer linear programming. A precise characterization of such matrices was given by Seymour (1980) in a paper titled *Decomposition of Regular Matroids*. Roughly speaking, such matrices are built from the incidence matrices of graphs, their "transposes", and an exceptional matrix by three types of summing operations.

A matrix over \mathbb{Q} is *dyadic* if every square submatrix has determinant in $\{0, \pm 2^i | i \in \mathbb{Z}\}$. Whittle conjectured that a similar decomposition theorem holds for dyadic matrices, where the basic building blocks are the incidence matrices of *signed graphs*, their "transposes", and a finite number of exceptional matrices.

In this talk, we will give a short survey of Seymour's result and show recent progress on Whittle's conjecture by Qin, Slilaty and Zhou.