Minimal matrices in algebra and combinatorics.

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(Tea 3:30 pm Math Lounge)

Abstract

A minimal matrix is a matrix A with non-negative integer entries such that the sequence of its entries, arranged in non-increasing order, is minimal (in the dominance order of partitions) among all sequences obtained from matrices that have the same row and column sum vectors as A. Minimal matrices first appeared in a characterization of 3-dimensional (0,1)-matrices that are uniquely determined by its plane sums.

It is a major open problem to give a satisfactory description of the multiplicity of a complex irreducible character of the symmetric group S_n in the Kronecker product of other two irreducible characters of S_n. In this talk we explain how to use minimal matrices to produce minimal components in Kronecker products of irreducible characters. A theorem due to E. Snapper plays an important role in some results presented in this talk.

This talk should be accessible to graduate students.