Combinatorics Seminar

Friday, June 25 , 2010

3:00 pm in Hume 331

Professor Manoel Lemos

Departamento de Matematica

Universidade Federal de Pernambuco
Recife, Pernambuco, Brazil

On triangle-free 3-connected matroids

ABSTRACT

An element e of a 3-connected matroid M is said to be essential when both $M\backslash e$ and M/e are not 3-connected. In 1966, Tutte characterized the 3-connected matroids having only essential elements. Only the wheels and whirls have this property. This result generalized a previous result that Tutte had obtained for graphs in 1963. Therefore it is possible to construct any 3-connected matroid, starting form a wheel or whirl, without leaving the class of 3-connected matroids and, in each step, realizing an one element lift or extension. This sentence can be rewritten as: it is possible to reduce a 3-connected matroid to a wheel or whirl, without leaving the class of 3-connected matroids, realizing, in each step, a single element contraction or deletion. In this talk, we present a similar result for the class of triangle-free 3-connected matroids. To the two reductions operations, namely, contracting one element and deleting one element, we need to add five more. At the end, we arrive to four families of irreducible matroids that, similarly to the wheels and whirls, can be characterized by its triads and squares. Our result generalizes a result proved by Kriesell for graphs in 2007.