

Welcome Home Workshop 2014

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TITOLO: Matroids and 2-levelness

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Abstract

Levelness is a geometric property of a point configuration that provides a useful bound to some polynomial optimization problems. We consider 0/1-point configurations arising from matroids, where the levelness is directly linked to the combinatorial structure of the matroid. Especially interesting are the matroids whose configuration is 2-level (2-level matroids); a good understanding of the relationship between geometry and combinatorics leads to an excluded minor characterization for this family of matroids. I will present 2-level matroids together with several features that it turns out to satisfy. In particular, I will show some structural properties that enable us to use tools from enumerative combinatorics to provide an asymptotic estimate of the number of 2-level matroids. Finally, I will explain how to describe volumes of the 2-level matroid polytopes in terms of descents of permutations.