

SEMINARIO

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Free pairs of a simplicial complex, and an application

Abstract: Let Δ be a simplicial complex with n vertices, we say that a pair (F, G) of non-empty, disjoint faces of Δ is free provided $F \cup G$ is the intersection of all the facets containing F ; moreover, given $(F, G), (F', G')$ two free pairs, we say that $(F, G) \leq (F', G')$ if $F \supseteq F'$ and $G \subseteq G'$. In this way, we say that a free pair is maximal if it is so with respect to this order.

On the other hand, let k be a field, let $\subseteq k[x_1, \dots, x_n]$ be the squarefree monomial ideal given by the nonfaces of Δ , and denote by $I^{[2]}$ the ideal obtained after raising to the square all the elements of I ; finally, denote by J_1 the smallest ideal which is roughly made up by polynomials p that are not divisible by $x_1 \cdots x_n$, that are not inside $I^{[2]}$, and such that $p \cdot q \in I^{[2]}$ for any $q \in I$.

The goal of this talk is to exhibit a 1 - 1 correspondence between minimal monomial generators of J_1 (provided $J_1 \neq 0$) and maximal free pairs of Δ ; as application, we use it to study the so-called Frobenius and Cartier algebras of Stanley-Reisner rings, which we introduce along the way.

The content of this talk is based on joint work with Santiago Zarzuela (Universitat de Barcelona, Spain).

Seminario A126, Facultad de Ciencias
Jueves 20 de Septiembre de 2018 (13:00)
Organiza: G.I.R. SINGACOM y G.I.R. TAAMC

