COMBINATORICS OF HANKEL RELATIONS[*]

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Abstract

We investigate the problem to determine the defining equations of the algebraic variety of Hankel two-planes in the projective space. We compute the first and the second partial lifting of the Machado's binomial relations, by applying tecniques of Sagbi bases theory.

MSC: 13A02, 16W50, 14M15, 13P10

keywords: Sagbi basis, Grassmann variety, Hankel variety, Toric deformation of a variety.

1 Introduction

In the study of toric ideals and of canonical bases of subalgebras many authors are interested on the problem to degenerate an arbitrary parametrically presented variety X into a toric variety Y. The basic idea is to degenerate the algebra generators into monomials and therefore the algebra polynomial relations to binomials relations. We can see how this can be accomplished if X is a Grassmann variety, since there is a beautiful link between the toric ideal I of the toric degeneration of X and the Grassmann-Plücker ideal of X, whose initial ideal, with respect to a fixed weighted term order ([13]) on the monomials of the polynomial ring of the presentation of