Makhlin, Igor
Gröbner fans of Hibi ideals, generalized Hibi ideals and flag varieties. (English) Zbl 07416000

Summary: The main goal of this paper is to give explicit descriptions of two maximal cones in the Gröbner
fan of the Plücker ideal. These cones correspond to the monomial ideals given by semistandard and PBW-
semistandard Young tableaux. For the first cone, as an intermediate result we obtain the description of a
maximal cone in the Gröbner fan of any Hibi ideal. For the second, we generalize the notion of Hibi ideals
by associating an ideal with every interpolating polytope. This is a family of polytopes that generalizes
the order and chain polytopes of a poset (à la Fang-Fourier-Litza-Pegel). We then describe a maximal
cone in the Gröbner fan of each of these ideals. We also establish some useful facts concerning PBW-
semistandardness, in particular, we prove that it provides a new Hodge algebra structure on the Plücker
algebra.

MSC:
14Mxx Special varieties
52Bxx Polytopes and polyhedra
13Pxx Computational aspects and applications of commutative rings

Keywords:
flag varieties; Gröbner fans; distributive lattices; poset polytopes; Young tableaux; Hodge algebras; tropical
geometry

Full Text: DOI

References:
Sturmfels, B., Combinatorial Algebraic Geometry, Fields Institute Communications, vol. 80 (2017), Springer-Verlag: Springer-
Verlag New York) · Zbl 1390.14194
Société Mathématique de France Paris · Zbl 0509.13026
Contemp. Math., 21, 1, Article 1850016 pp. (2019) · Zbl 1420.14138
Groups, 16, 1, 71-89 (2011) · Zbl 1237.17011
[10] Feigin, E.; Fourier, G.; Littelmann, P., Favourable modules: filtrations, polytopes, Newton-Okounkov bodies and flat degener-
(2020) · Zbl 1437.52011
Cambridge University Press Cambridge · Zbl 0878.14034
(1996) · Zbl 0909.14028
[26] Makhlin, I., Gelfand-Tsetlin degenerations of representations and flag varieties

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.