Eser, Zekiyeh Sahin; Matusevich, Laura Felicia
Primary components of codimension two lattice basis ideals. (English) Zbl 1387.13048
Ann. Comb. 21, No. 3, 353-373 (2017).

A codimension two lattice basis ideal is a binomial ideal generated by two binomials whose exponent vectors are linearly independent. The present paper characterizes the binomial primary decomposition of such an ideal. It thereby, in this special case, finishes a theory initiated in [S. Hoşten and J. Shapiro, J. Symb. Comput. 29, No. 4–5, 625–639 (2000; Zbl 0968.13003)] where the associated primes have been determined, and [A. Dickenstein et al., Math. Z. 264, No. 4, 745–763 (2010; Zbl 1190.13017)] where the so-called toral primary components have been characterized. Describing the remaining Andean primary components is reduced to certain graph theoretic problems which form the core of this paper.

As an application, the authors compute the set of parameters for which a bivariate Horn system of hypergeometric differential equations is holonomic.

Reviewer: Thomas Kahle (Magdeburg)

MSC:
13F99 Arithmetic rings and other special commutative rings
52B20 Lattice polytopes in convex geometry (including relations with commutative algebra and algebraic geometry)
33C70 Other hypergeometric functions and integrals in several variables
20M25 Semigroup rings, multiplicative semigroups of rings
05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)

Keywords:
lattice point graphs; lattice basis ideals; primary decomposition; hypergeometric functions

Software:
Binomials.m2; CoCoA; SINGULAR; Macaulay2

Full Text: DOI arXiv

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