

## **The combinatorics of binomial ideals**

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In a polynomial ring, a binomial says that two monomials are scalar multiples of each other. Forgetting about the scalars, a binomial ideal describes an equivalence relation on the monoid of exponents. In combinatorial applications one is often only interested in this relation, and not the binomial ideal. We present mesoprimary decomposition, a canonical decomposition of monoid congruences and some applications from algebraic statistics