

1049-60-19

**Steven N Evans** and **Bernd Sturmfels\*** (bernd@math.berkeley.edu), Department of Mathematics, University of California, Berkeley, CA 94720, and **Caroline Uhler**. *Commuting birth-and-death processes*.

We use methods from combinatorics and algebraic statistics to study analogues of birth-and-death processes that have as their state space a finite subset of the  $m$ -dimensional lattice and for which the  $m$  matrices that record the transition probabilities in each of the lattice directions commute pairwise. One reason such processes are of interest is that the transition matrix is straightforward to diagonalize, and hence it is easy to compute  $n$  step transition probabilities. The set of commuting birth-and-death processes decomposes as a union of toric varieties, with the main component being the closure of all processes whose nearest neighbor transition probabilities are positive. We exhibit an explicit monomial parametrization for this main component, and we explore the boundary components using primary decomposition. (Received January 19, 2009)