Toric statistical models: parametric and binomial representations

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Abstract Toric models have been recently introduced in the analysis of statistical models for categorical data. The main improvement with respect to classical log-linear models is shown to be a simple representation of structural zeros. In this paper we analyze the geometry of toric models, showing that a toric model is the disjoint union of a number of log-linear models. Moreover, we discuss the connections between the parametric and algebraic representations. The notion of Hilbert basis of a lattice is proved to allow a special representation among all possible parametrizations.