Algebraic Models in Statistics

Johannes Rauh
MPI for Mathematics in the Sciences, Leipzig
e-mail: jrauh@mis.mpg.de

Abstract

Exponential families are an important class of statistical models, i.e., parameterized families of probability distributions. It has been noted that in the case where the probability distributions live on a finite set most exponential families which occur in applications are actually solution sets of binomial polynomials. In fact they can be identified with the nonnegative real part of projective toric varieties. These toric varieties are not necessarily normal.

This talk will explain this connection and give some examples. If time permits I will comment on how the generators of the binomial ideal defining the toric variety can be used in statistical testing.

References

[1] P. Diaconis, B. Sturmfels, 26 (1998) *Algebraic algorithms for sampling from conditional distributions.* Annals of Statistics, **26** (1998), 363–397