

Anna Seigal, University of Oxford, UK

SUPERMODULAR INEQUALITIES IN HIDDEN VARIABLE MODELS

Abstract: The implicit semi-algebraic description of a statistical model gives a membership test based on the signs of polynomials. In this talk we discuss supermodular inequalities, which take the form of signs of conditional independence statements. We focus on two graphical models with hidden variables, both on three binary observed variables. The semi-algebraic description of the models is given in terms of supermodular inequalities. We use this description to obtain a closed form expression for the maximum likelihood estimates, and discuss supermodular inequalities of larger models.

This talk is based on joint work with Guido Montúfar.

References:

- [1] A. Seigal, G. Montúfar: Mixtures and Products in Two Graphical Models, *Journal of Algebraic Statistics* 9 (2018) no. 1, 1–20.
- [2] E. Allman, J. Rhodes, B. Sturmfels and P. Zwiernik: *Tensors of nonnegative rank two*, *Linear Algebra and its Applications* 473 (2015) 37–53.