

Eliana Duarte, Max-Planck-Institut for Mathematics in the Sciences, Leipzig

GRÖBNER BASES FOR STAGED TREE MODELS

Abstract: Staged tree models are a class of discrete statistical models that encode conditional independence statements via a tree with an equivalence relation on its vertices. For instance they can be used to represent conditional independence statements from graphical models such as discrete Bayesian networks and decomposable models [1]. In this talk we review the study of the defining equations of staged tree models from [2] and present a method to construct Gröbner bases for toric staged tree models using toric fiber products. We illustrate these results with examples of Gröbner bases for conditional independence models.

This talk is based on joint work with Lamprini Ananiadi.

References:

- [1] J. Q. Smith and P. E. Anderson (2008). Conditional independence and chain event graphs. *Artificial Intelligence*, 172(1):42 – 68, .
- [2] E. Duarte, and C. Görgen (2019). Equations defining probability tree models. *Journal of Symbolic Computation*.
- [3] S. L. Lauritzen (1996). *Graphical Models*. Oxford University Press, Oxford.