

Graduiertenkolleg

Experimentelle und konstruktive Algebra



Kolloquiumsvortrag

Dienstag, 15. Juli 2014, 14:15 Uhr, Hörsaal VT

JOHANNES RAUH (MAX-PLANCK-INSTITUT FÜR MATHEMATIK IN DEN NATURWISSENSCHAFTEN, LEIPZIG):

Markov bases—how to use them and how to compute them

Consider a system of linear integer equations $Ax = b$ and inequalities $Cx \geq d$, $x \in \mathbb{Z}^n$. If $m \in \ker_{\mathbb{Z}} A$, then $x + m$ is another solution, provided that $C(x + m) \geq d$. A *Markov basis* \mathcal{B} is a finite subset of $\ker_{\mathbb{Z}} A$ such that any two solutions x, x' can be connected by iteratively choosing moves from \mathcal{B} such that all intermediate points are themselves solutions. A theorem of Diaconis and Sturmfels says that finite Markov bases exist and can be chosen independently of b and d . Moreover, Markov bases can be computed from generating sets of toric ideals. These toric ideals consist of polynomial invariants that describe exponential families; for example, graphical models. Therefore, Markov bases also give information about these statistical models, such as the possible support sets.

In my talk I give an overview of Markov bases and present a new lifting procedure that allows to compute Markov bases inductively (joint work with Seth Sullivant). This procedure can be applied to toric fiber products to obtain new finiteness results for Markov bases of families of graphical models.

Wir laden alle Interessierten herzlich ein.

Ab 13:30 Uhr gibt es Kaffee und Tee im Seminarraum des Lehrstuhl D für Mathematik (Pontdriesch 14/16, Raum 103).