Leibniz Universität Hannover

Oberseminar

zur

Algebra und Algebraischen Kombinatorik

Dr. Johannes Rauh

(Leibniz Universität Hannover)

"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.

Montag, 24.11.2014

ab 14:15 Uhr, Raum a410

Hauptgebäude der Leibniz Universität Hannover

Alle Interessierten sind herzlich eingeladen.

Institut für Algebra, Zahlentheorie und Diskrete Mathematik