AUTOMORPHISM GROUPS OF AFFINE ALGEBRAIC VARIETIES / Alexei Kanel-Belov

Moscow Institute of Physics and Technology (National Research University)

Degree or qualification is awarded: **PhD (Candidate of Science)**

Language of study: **English**
Mode of study: **full-time**
Duration: **4 years**
Availability of free education: **yes**
Price: **375 000 RUB**

Programme curator: **Denis Ustyuzhaninov**
Tel.: **+7 (498) 713 91 70**
E-mail: interadmission@phystech.edu

Entry requirements:

- Master's degree / equivalent in a related field
- B2 level of English
- Good track record of publications related to the topic of the intended research
- Strong research proposal 1,500 - 3,500 words

Research supervisor:
Alexei Kanel-Belov
PhD, DSc
Professor of Bar-Ilan University(Israel)

Supervisor's research interests:

- Affine algebraic geometry Jacobian conjecture and Quantization. Famous Jacobian conjecture said, "Is it true that locally invertible polynomial mapping is globally invertible?" It was found that many questions of affine algebraic geometry and polynomial automorphism are in fact quantization problems. (see arXiv: math/0512171, and review https://arxiv.org/abs/1912.03759).
- Combinatorics of words. This subject has deep relations with almost all mathematics (such as dynamical systems, mathematical biology, group and ring theory), on the other hand – many problems do not demand much knowledge. Many problems related to Pisout conjecture, Rauzy fractals and billiards.
- More detailed description see my profile http://www.mathnet.ru/php/person.phtml?personid=8698&option_lang=eng

Research highlights:

- This research program involves international collaboration with research groups in the Israel, and France (ENS).
- Supervisor's specific requirements: for 1 – Background in basic algebraic geometry. and Acquaintance with algebraic groups.
- for 2 – basic calculus, some elementary knowledge on dynamical systems is preferable.

Main publications:

- Ilya Ivanov-Pogodayev, Alexey Kanel-Belov, Construction of infinite finitely presented nillsemigroup, 2014 , 160 pp., 131 figures, in Russian, arXiv: 1412.5221.
- Ya. Belov, "The local finite basis property and local representability of varieties of associative rings", Izv. Math., 74:1 (2010), 1–126.
- J. Kanel-Belov, A. V. Dyskin, Y. Estrin, E. Pasternak, I. A. Ivanov-Pogodaev, "Interlocking of convex polyhedra: towards a geometric theory of fragmented solids", Mosc. Math. J., 10:2, http://www.ams.org/distribution/mmj/vol10-2-2010/kanel-belov-etal.pdf (2010), 337–342 http://olympiads.mccme.ru/mmo/2000/ mmo2000.htm,

arXiv: 0812.5089

- Ya. Kanel-Belov, V. A. Voronov, D. D. Cherkashin, “On the chromatic number of infinitesimal plane layer”, St. Petersburg Math. J., 29:5 (2018), 761–775.
- Ya. Kanel-Belov, M.L. Kontsevich, “The Jacobian conjecture is stably equivalent to the Dixmier conjecture”, Mosc. Math. J., 7:2 (2007), 209–218 , arXiv: math/0512171.
- Alexei Kanel-Belov, Sergey Malev, Louis Rowen, Roman Yavich, “Evaluations of noncommutative polynomials on algebras: Methods and problems, and the Lvov-Kaplansky Conjecture”, Symmetry Integrability Geom. Methods Applications,, 16 (2020), 071 , 61 pp., Special Issue on Algebra, Topology, and Dynamics in Interaction in honor of Dmitry Fuchs https://www.emis.de/journals/SIGMA/2020/071/
- Ya. Kanel-Belov, A. A. Chilikov, “On the Algorithmic Undecidability of the Embeddability Problem for Algebraic Varieties over a Field of Characteristic Zero”, Math. Notes, 106:2 (2019), 299–302.
- 8. A.Belov-Kanel, Jie-Tai Yu., “Stable tameness of automorphisms of F<x,y,z> fixing z.”, Selecta Mathematica, 18:4 (2012), 799–802 , arXiv: 1102.3292.

Specializations within this programme