Toghrul Karimov

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Education

since Sep 2019	PhD student at Max Planck Institute for Software Systems, Germany Supervisor: Joël Ouaknine Area: Verification of linear dynamical systems
2015-2019	MCompSci Computer Science, University of Oxford, UK First Class Honours Bachelor's thesis: On the Černý conjecture in theory of finite automata Master's thesis: Synchronization problems in Markov decision processes
2013-2015	IB Diploma Programme, 41/45 points, 7/7 in Further Mathematics Dünya School, Baku, Azerbaijan

Research Areas

- Broadly speaking, I am interested in applying techniques from algebra, number theory and logic to solving open problems in theoretical computer science and control theory.
- My PhD thesis is about finding algorithms that verify imperative programs (e.g. prove that a given program always terminates) using theory of (linear) dynamical systems.

Publications

- C. Baier, F. Funke, S. Jantsch, T.Karimov, E. Lefaucheux, F. Luca, J. Ouaknine, D. Purser, M. A. Whiteland, and J. Worrell.
  The Orbit Problem for parametric linear dynamical systems.
  To appear in *Proceedings of CONCUR 2021, LIPIcs 203.*
- J. D'Costa, T. Karimov, R. Majumdar, J. Ouaknine, M. Salamati, S. Soudjani, and J. Worrell.
  The Pseudo-Skolem Problem is decidable.
  To appear in *Proceedings of MFCS 2021, LIPIcs 202.*
- S. Almagor, T. Karimov, E. Kelmendi, J. Ouaknine, and J. Worrell.
  Deciding ω-regular properties on linear recurrence sequences.
  POPL 2021, Proceedings of the ACM on Programming Languages, Volume 5, issue POPL.
- C. Baier, F. Funke, S. Jantsch, T. Karimov, E. Lefaucheux, J. Ouaknine, A. Pouly, D. Purser, and M. A. Whiteland.
  Reachability in dynamical systems with rounding.
  Proceedings of FSTTCS 2020, LIPIcs 182.
- T.Karimov, J.Ouaknine, and J.Worrell.
  On LTL model-checking for low-dimensional discrete linear dynamical systems.
  Proceedings of MFCS 2020, LIPIcs 170.

Teaching

Summer 2020	Automata and Sequences, teaching assistant University of Saarland
Winter 2019	Convex Optimization and Analysis, teaching assistant University of Saarland

Talks and Presentations

- Invariants and impossibility: from geometric constructions to solving polynomial equations. *Monsoon Math 2021.*
- Deciding ω-regular properties on linear recurrence sequences. *POPL 2021.*
- On verification of linear dynamical systems. *Lighthning Talk at MPI-SWS, 2020.*
- On LTL model-checking for low-dimensional discrete linear dynamical systems. *MFCS 2020.*