Ramanathan S. Thinniyam

October 28, 2017

Date of Birth: 19 Oct 1986 **Nationality: Indian** **Gender: Male**

The Institute of Mathematical Sciences
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PhD Candidate

The Institute of Mathematical Sciences (2012-present)
Expected submission date: April 2018
Thesis title: Definability and Decidability in Graph Orderings

Education

MSc. Computer Science, Chennai Mathematical Institute (2010-2012)
Thesis: Proof Theory of Intuitionistic Modal Logics
CGPA: 9.31/10

BTech. Mechanical Engineering, Indian Institute of Technology Madras (2004-2008)
Project: Numerical Simulation using Streamfunction Vorticity Formulation for the Lid Driven Square Cavity
CGPA: 8.66/10

Research Experience

PhD. Candidate, Aug 2012 – Present
The Institute of Mathematical Sciences
Consider the set $\mathcal{G}$ of isomorphism types of finite, undirected, simple graphs. Relations such as subgraph, induced subgraph and minor form partial orders on this set. I am studying the first order theories of such graph orders under the guidance of Prof. R. Ramanujam.

Masters Student, Aug 2010 – May 2012
Chennai Mathematical Institute
I read the PhD. thesis titled The Proof Theory and Semantics of Intuitionistic Modal Logic by Alex Simpson and worked through the results. Guided by Prof. S.P.Suresh(CMI) and Prof. R. Ramanujam (IMSc).

Research Assistant, Aug 2008 – Feb 2010
Network Coding and Reliable Communications Group, Research Laboratory of Electronics, Massachusetts Institute of Technology
Used genetic algorithms to minimize the number of computational nodes required to do network coding in an optical network. The decision version of this problem is known to be NP-complete.

Research Student, Aug 2007 – Dec 2007
Prof. S. V. Raghavan, Networks Lab, Indian Institute of Technology Madras
Designed a Business Intelligence System to collect, analyze and interpret data obtained from heterogeneous sources.

Teaching Experience

Teaching Assistant, Second semester 2017
Model Theory
Instructor: Prof. R. Ramanujam
The Institute of Mathematical Sciences
A course on Model Theory with an emphasis on Finite Model Theory (course text : Elements of Finite Model Theory by Libkin).

Teaching Assistant, Second semester 2015
Introduction to Logic
Instructor: Prof. R. Ramanujam
The Institute of Mathematical Sciences
An introductory graduate course covering propositional, modal and first order logic, including computational

aspects such as PSPACE-completeness of modal satisfiability.

Programming languages

Matlab, C, Haskell

Relevant Coursework

Basic Courses:
Introduction to Logic, Computational Complexity I, Theory of Computation, Algorithms, Graph Theory, Discrete Mathematics.
Advanced Courses:
Proof Theory (text: Troelstra and Schwichtenberg), Model Theory (text: basics from David Marker, Finite Model Theory by Libkin), Proof Complexity (Logical Foundations of Proof Complexity by Cook and Nguyen), Algebraic Automata Theory (semi-group theory beginning with Schutzenburger's theorem), Computational Complexity II (Pseudorandomness,constant depth circuits), Algebra and Computation (Graph Isomorphism problem; finite fields and polynomial factorization).

Conference Publications

Thinniyam RS. Definability of recursive predicates in the induced subgraph order. In Indian Conference on Logic and Its Applications 2017 Jan 5 (pp. 211-223). Springer, Berlin, Heidelberg.

Ramanujam R, **Thinniyam RS**. Definability in first order theories of graph orderings. In International Symposium on Logical Foundations of Computer Science 2016 Jan 4 (pp. 331-348). Springer, Cham.

Thinniyam RS, Kim M, Médard M, O'Reilly UM. Network coding in optical networks with O/E/O based wavelength conversion. In Optical Fiber Communication (OFC), collocated National Fiber Optic Engineers Conference, 2010 Conference on (OFC/NFOEC) 2010 Mar 21 (pp. 1-3). IEEE.

In Process

Thinniyam RS. Defining recursive predicates in graph orders. arXiv preprint arXiv:1709.03060. 2017 Sep 10 (submitted to Logical Methods in Computer Science).

Ramanujam R, **Thinniyam RS**. Definability in first order theories of graph orderings (submitted to a special issue of the Annals of Pure and Applied Logic).

Talks

The Graph Reconstruction Conjecture
at *Institute Seminar Day, IMSc* March 8, 2017.

Definability of Recursive Predicates in the Induced Subgraph Order
at *Indian Conference on Logic and its Applications (**ICLA**)* January 5, 2017.

Definability in First Order Theories of Graph Orderings
at *International Symposium on Logical Foundations of Computer Science (**LFCS**)* December 28, 2015.

References

Prof. R. Ramanujam
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