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Debajyoti Nandi

*“Math is sometimes called the science of patterns”
— Ronald Graham*

Education

- 2004–2014 **Doctor of Philosophy in Mathematics**, Rutgers, The State University of New Jersey, New Brunswick, NJ, USA.
- 2002–2004 **Master of Science in Mathematics**, Chennai Mathematical Institute, Chennai, India.
- 1999–2002 **Bachelor of Science with Honors in Mathematics and Computer Science**, Chennai Mathematical Institute, Chennai, India.

Doctoral Dissertation

- Title *Partition identities arising from the standard $A_2^{(2)}$ -modules of level 4.*
- Adviser Prof. Robert L. Wilson, Department of Mathematics, Rutgers University.
- Topics Representation theory of vertex operator algebras and infinite-dimensional Kac–Moody Lie algebras, partition identities, algebraic combinatorics, experimental math.
- Abstract The interplay between representation theory of affine Kac–Moody Lie algebras and classical partition identities was exemplified by the remarkable vertex-operator-theoretic interpretation and proof of the classical Rogers–Ramanujan identities by Lepowsky–Wilson [1982–85]. Capparelli discovered new combinatorial identities using standard representations of $A_2^{(2)}$ of level 3 in his PhD thesis [1988]. However, higher level cases of $A_2^{(2)}$ remained unsolved. In this dissertation, I give a vertex-operator-theoretic construction of “tight” spanning sets for the standard $A_2^{(2)}$ -modules of level 4, and based on it, propose three new partition identities showing exciting new features that are not seen in previously known partition identities associated with representations of affine Lie algebras.

Publication

- In preparation D. Nandi, “Partition identities arising from the level 4 standard modules for the affine Lie algebra $A_2^{(2)}$,” *in prep.*
- 2010 L. Carbone, S. Chung, L. Cobbs, R. McRae, D. Nandi, Y. Naqvi and D. Penta, “Classification of hyperbolic Dynkin diagrams, root lengths and Weyl group orbits,” *J. Phys. A: Math. Theor.* **43** 155209, 2010.

Teaching Experience

- 2012–2014 **Part-time Lecturer**, *Department of Mathematics, Rutgers University, Piscataway, NJ.*
Developed course and assessment materials, planned and taught lectures, set up and maintained course web-pages (on sakai platform as well as on department homepage), evaluated and assigned final grades for Math 244 (Elementary Differential Equations) with class-size of 75–90 students; planned and conducted recitation/workshop/lab (Maple) sessions, developed assessment materials, graded and evaluated for various undergraduate courses such as Math 135, Math 151 (Calculus-I), Math 152 (Calculus-II), Math 251 (Multi-variable Calculus), Math 244, etc. with class-size of 25–35 students.
- 2006, 2007, **Summer Instructor**, *Rutgers University, Piscataway, NJ.*
2010–2014, Developed course and assessment materials, planned and taught lectures, set up and maintained course web-pages (on sakai platform as well as on department homepage), evaluated and assigned final grades for various undergraduate math courses during the Summer session with class-size of 25–35 students. (These are 6–8 week-long accelerated and condensed, but equivalent versions of the same math courses offered during the Fall/Spring sessions).
- 2005–2012 **Recitation/Workshop Instructor**, *Department of Mathematics, Rutgers University, Piscataway, NJ.*
Conducted Q&A (recitation) or problem-solving (workshop) sessions, reviewed course materials, designed assessment materials, graded quizzes and/or homeworks, and assisted with the grading of the exams for various undergraduate math courses, such as Math 135, 151, 152, 251 (various Calculus courses), Math 244 (Differential Equations), with class-size of 25–35 students; also administered Maple labs for Math 244 and 251 students.
- Spring 2012 **Head TA**, *Department of Mathematics, Rutgers University, Piscataway, NJ.*
Developed and maintained Maple labs for Math 251, in addition to conducting workshop sessions, grading and evaluating.
- 2004–2005 **Grader**, *Department of Mathematics, Rutgers University, Piscataway, NJ.*
Graded homeworks/quizzes for advanced undergraduate courses.

Awards, Honors and Financial Support

- 2004–2012 Teaching Assistantship, Rutgers University, NJ, USA.
2009 Summer Research Grant, Rutgers University, NJ, USA.
2005 Rutgers Weill Fellowship, Rutgers University, NJ, USA.
- 2002–2004 Junior Research Fellow, Chennai Mathematical Institute, India.
2002 Visiting Student, CMI-ENS Exchange Program, École Normale Supérieure, Paris, France.
2001 Visiting Student, Visiting Student Research Program, Tata Institute of Fundamental Research, Mumbai, India.
2000 Visiting Student, Summer School on Projective Geometry, Harish-Chandra Research Institute, Allahabad, India.
1999 Visiting Student, Summer School on Physical and Biological Sciences, Indian Association for the Cultivation of Science, Kolkata, India.
1999 Selected to appear for Indian National Mathematics Olympiad (INMO), Indian National Physics Olympiad (INPhO) and Indian National Chemistry Olympiad (INChO).

1997 NTSE (National Talent Search Examination) Scholarship, National Council of Educational Research and Training (NCERT), India.

Talks/Presentation

- 2015 “Interplay between partitions, representation theory and vertex operator algebras,” at: *1st CMI Alumni Conference*, Chennai Mathematical Institute, Chennai, India.
- 2014 “Combinatorial identities arising from representation theory of affine Lie algebras using vertex-operator-theoretic techniques,” at: Indian Institute of Science Education and Research, Mohali, India.
- 2014 “Combinatorial identities arising from representation theory of affine Lie algebras using vertex-operator-theoretic techniques,” at: Indian Institute of Technology, Delhi.
- 2014 “Combinatorial identities arising from representation theory of affine Lie algebras using vertex-operator-theoretic techniques,” at: Institute of Mathematical Sciences, Chennai, India.
- 2014 “Combinatorial identities arising from representation theory of affine Lie algebras using vertex-operator-theoretic techniques,” at: Chennai Mathematical Institute, Chennai, India.
- 2014 “Partition identities arising from the standard $A_2^{(2)}$ -modules of level 4,” at: *Lie Groups / Quantum Math Seminar*, Department of Mathematics, Rutgers University, NJ.
- 2011 “Evidence for conjectured partition identities related to the level 4 standard modules for the affine Lie algebra $A_2^{(2)}$,” at: *Combinatorics Seminar at DIMACS*, Rutgers University, NJ.
- 2009 “Combinatorial identities using representation theory,” at: *Introduction to Mathematics at Rutgers, 2009*, Department of Mathematics, Rutgers University, NJ.

Computer Skills

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| Math | Maple, Mathematica | |
| Programming | C, Maple, Bash, Python, Mathematica, C++ | <i>Extensive use</i> <i>Occasional use</i> |
| Publishing | \LaTeX , HTML, CSS | |
| Miscellaneous | GNU/Linux, Sakai | |

Languages

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|---------------|------------------|
| Fluent/Native | English, Bengali |
| Intermediate | Hindi |
| Beginner | French |

References

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