Mathematics Colloquia, 2007

Department of Mathematics and Statistics, Dalhousie University

Location: Colloquium Room (Chase Building, Room 319); Time: Monday's Talks 3:30-4:30PM, Thursday's Talks 2:30-3:30PM
Mathematics Colloquium Chair: Roman Smirnov

Guidelines for Colloquium Speakers

- Colloquia are expected to be 50 minutes long, going over time is not recommended
- The Colloquium Room (Chase 319) is equipped with a blackboard and two overhead projectors. If necessary, a laptop and/or a data projector can be provided, in which case please inform us in advance
- The speakers are encouraged to pitch their material at a level appropriate for non-specialists in the area (please remember that in G.-C. Rota's words a good lecture is when the lecturer gives everyone in the audience ``something to take home.'')
- Please feel free to visit the following related links , where you may find additional relevant information

To retrieve the info on a specific Colloquium, please click on the corresponding date: 12.02.2007, 05.03.2007, 12.03.2007, 26.03.2007, 14.05.2007
or the name of a speaker:
Neil Calkin, Karen Chandler, John Cosgrave, Dan Goldston, Mikhail Kotchetov,

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Upcoming Colloquia

Date:	March 26 (Monday)
Speaker:	Mikhail Kotchetov (Memorial University of Newfoundland)
Title:	Group gradings on simple Lie algebras

Date:	May 14 (Monday)
Speaker:	John Cosgrave (St. Patrick's College, Dublin)
Title:	Gauss-4 primes: a (beautiful) new sequence of primes

Date:	February 12, 2007 (Monday)
Speaker:	Karen Chandler (Illinois)
Title:	Multiple conjectures and multible theorems on multiple points.
Abstract:	(to view the abstract, click here)
Local host:	Karl Dilcher

Date:	March 5, 2007 (Monday)

Speaker: Neil Calkin (Clemson University)

Title: Clemson's Research Experience for Undergraduates (REU)

Abstract: I'll discuss Clemson's REU in mathematics, describing the program, our philosophies and implementation, and discuss some of the research projects undertaking, including parallel algorithms for computing (large) partition numbers, analyzing the Quadratic Sieve factorization algorithm, and discovering and proving new Ramanujan-type identities for restricted partition functions. This is joint work with Kevin James.

Local host: Jon Borwein/Karl Dilcher

Date: March 12, 2007 (Monday)

Speaker: Dan Goldston (San Jose State University)

Title: Are there infinitely many twin primes?

Abstract: This lecture given on April 6, 2006 at Cornell as the first lecture in the Chelluri Lecture Series in memory of Thyagaraju (Raju) Chelluri will be presented in our Colloquium Series as a DVD movie. To view the abstract and acquire more information on the Chelluri Lecture Series at Cornell, click here

Local organizers: Alan Coley/Karl Dilcher

Date: March 26, 2007 (Monday)

Speaker: Mikhail Kotchetov (Memorial University of Newfoundland)

Title: Group gradings on simple Lie algebras

Abstract: Group gradings on algebras, especially simple algebras, have been extensively studied since the 1960s. In particular, gradings on Lie algebras arise in the theory of symmetric spaces, Kac-Moody algebras, and Lie coloralgebras. In the context of simple Lie algebras, it suffices to consider only gradings by abelian groups (since the support of any grading generates an abelian group). V. Kac classified all gradings by cyclic groups on finite-dimensional simple Lie algebras in 1968. We will discuss recent progress in the classification of gradings on finite-dimensional simple Lie algebras by arbitrary abelian groups.

Local host: Roman Smirnov

Date: May 14, 2007 (Monday)

Speaker: John Cosgrave (St. Patrick's College, Dublin)

Title: Gauss-4 primes: a (beautiful) new sequence of primes

Abstract: In this talk (which will be understood by everyone - and that's a bet!) I introduce what I believe to be a new sequence of primes, one which I wish to call the Gauss-4 primes. Incidentally, every Fermat prime from 5 onwards is such a prime. You will not (yet) find that sequence in Sloane's well-known (and quite remarkable) On-Line Encyclopedia of Integer Sequences (check it out at www.research.att.com/~njas/sequences/). This sequence emerges in a most natural way from my recent wide-ranging work in connection with extending Gauss' generalisation of Wilson's theorem (if you don't already know what that is, then do not worry, for I shall explain it). The Gauss-4 primes begin: 5, 17 , 97, 193, 241 , 257, 641, 929, 3361 , 12289, 46817 , 65537, 114689, 120833, 285697, 345089, 652081, 786433, 1179649, 1908737, 3200257, 11118593, 27590657, 200578817, 2742091777, 8780414977, 10812547073, 12055618177 , ... The Gauss-4 primes occur at 'levels' (I shall explain what that means in my talk) 0, 4, 5, 6, 7, ... (5, by the way, is the only Gauss- level 0 prime, and there are none at levels 1, 2, 3), and I mention that the primes in

bold are those at level 4 (now if you enter that subsequence in Sloane you will find that the first five do correspond to an entry... but then immediately diverge... there is much to be said about this...). The next several Gauss-4 level 4 primes - which could never have been found by direct systematic computation alone (since they involve massive factorial based modular reductions) - have 150, 229, 339, 401, 594, 806, 1087, 6404, 7645, 8517, 10038, 10051, 13230 and 14280 decimal digits, and are completely characterised by certain solutions of a single Fermat-Pell equation. The Gauss-4 primes 120833, 262337, 285697, 345089 (for example), do not appear in any sequence in Sloane's Encyclopedia. These primes have very beautiful properties, but, to find out what those properties are, you will have to attend... The background to my recent work is in the public domain, with my fortuitous discovery in December 2004 of what I have called 'Jacobi primes' (you will not find those in Sloane either). Andrew Granville played an invaluable part in connection with proofs. You might wish to read in advance of my Dalhousie colloquium talk, my February 2005 Jacobi-primes, Maple-based, Trinity College Dublin Student Mathematics Society talk at my web site. It is available in both Maple or html format at www.spd.dcu.ie/johnbcos/jacobi.htm

Local host: Karl Dilcher

Related Links

- *Ten lessons I wish I had been taught* by G.-C. Rota (see *Lecturing*)
- *How to give a good colloquium?* by J. E. McGarthy
- *Any questions?* by D. Machale (*funny*)