NUMBER THEORY SEMINAR

Asymptotics of a family of binomial sums

Rob Noble

Dalhousie University

WHEN: Wed 30 Jun 2010, 1:30 p.m.

WHERE: Chase 319

ABSTRACT: Using a recent method of Pemantle and Wilson, the asymptotics of a family of combinatorial sums that involve products of two binomial coefficients and includes both alternating and non-alternating sums will be determined. With the exception of finitely many cases the main terms will be obtained explicitly, while the existence of a complete asymptotic expansion is established. A recent method by Flajolet and Sedgewick will be used to establish the existence of a full asymptotic expansion for the remaining cases, and the main terms will again be obtained explicitly. Among several specific examples, generalizations of the central Delannoy numbers and their alternating analogues will be considered.

A mod p^3 analogue of a theorem of Gauss on binomial coefficients

Karl Dilcher

Dalhousie University

WHEN: Wed 30 Jun 2010, 2:00 p.m.

WHERE: Chase 319

ABSTRACT: The theorem of Gauss that gives a modulo p evaluation of a certain central binomial coefficient was extended modulo p^2 by Chowla,

Dwork, and Evans. In this talk I present a further extension to a congruence modulo p^3, with a similar extension of a theorem of Jacobi. This is done by first obtaining congruences to arbitrarily high powers of p for certain quotients resembling binomial coefficients and related to the p-adic gamma function. These congruences are of a very simple form and involve Catalan numbers as coefficients. As another consequence we obtain complete p-adic expansions for certain Jacobi sums. (Joint work with J.B. Cosgrave).

Growth Rates of Recurrence Sequences with Periodic Coefficients

Karyn McLellan
Dalhousie University

WHEN: Wed 30 Jun 2010, 2:30 p.m.

WHERE: Chase 319

ABSTRACT: This talk will extend some ideas from Viswanath's work on random Fibonacci sequences by looking at non-random cases. Specifically, I will look at second order linear recurrence sequences whose coefficients belong to the set 1, -1 and form periodic cycles. I will analyze the growth of such sequences and develop criteria for determining whether a given sequence is bounded, grows linearly or grows exponentially. Also, I will introduce an equivalence relation on the sequences such that each equivalence class has a common growth rate and consider the number of such classes for a given cycle length.

Transcendence of Infinite Series with Applications of Baker's Theorem

Chester Weatherby
University of Delaware

WHEN: Wed 30 Jun 2010, 3:00 p.m.

WHERE: Chase 319

ABSTRACT: Determining whether or not a given series is algebraic or transcendental appears as early as Euler's theorem that the zeta function evaluated at even values is related to powers of pi times a rational number (and therefore transcendental). We will examine two families of (simple) infinite series and attempt to characterize whether nor not a given series is transcendental. Baker's Theorem on linear forms in logarithms is used heavily in the characterization and will be reviewed.

Any questions, please email: rnoble@mathstat.dal.ca.