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INFORMAL ANALYSIS SEMINAR/Lecture Series in Analysis
Saturday and Sunday, March 14-15, 2015

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LECTURES: MSB 228
REFRESHMENTS: MATH & CS Lounge (3rd Floor MSB)

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Alexandre Eremenko (Purdue University): "Zeros of successive derivatives."

Abstract: Let f be a real entire function (real on the real line). Let $N(f)$ be the number of zeros of f which do not lie on the real line.

Theorem. *For every real entire function f we have an alternative: either $N(f^{(n)}) \to \infty$ or $N(f^{(n)}) = 0$ for all sufficiently large n.*

This simply stated theorem is a recent achievement which completes a long line of development originating from the work of Laguerre and Pólya. In these lectures, a general outline will be given, and the following partial results on the subject will be explained in full detail.

Laguerre-Pólya class LP consists of real entire functions which can be approximated uniformly on compacts by real polynomials with real zeros.

Theorem 1. *If $f = ph$, where p is a real polynomial and $h \in LP$, then $N(f^{(n)}) = 0$ for all large n.*

Theorem 2 (Former Wiman's Conjecture, 1911). *If f is a real entire function such that ff'' has only real zeros, then $f \in LP$.*

The proofs use a wide range of analytic techniques which were developed in 20-th century in the work of Wiman, Pólya, Goncharov, Hayman, Levin, Ostrovskii, Hellerstein, Williamson, Kim, Ki, Sheil-Small, Bergweiler, Eremenko and Langley..

Grigoris Paouris (Texas A&M University): "From inequalities for correlated Gaussian random vectors to concentration inequalities."

Abstract: Functional inequalities and concentration inequalities, as the Gaussian concentration of measure, Erhard's inequality or log-Sobolev inequality, as well as Prekopa-Leindler and Brascamp-Lieb inequality are the basic tools in contemporary asymptotic geometric analysis. My goal in these talks is to present inequalities about correlated Gaussian vectors and show how the above inequalities can be deduced as corollaries. I will be based on some joint works with Wei-Kuo Chen, Nikos Dafnis and Joe Neeman.

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Saturday, March 14

11:00 - 11:30 Coffee
11:30 - 12:30 Alexandre Eremenko
 12:30 - 1:30 Lunch in the MSB Library
  1:30 - 2:30 Grigoris Paouris
  2:30 - 3:00 Break
  3:00 - 4:00 Alexandre Eremenko
  4:00 - 4:30 Break
  4:30 - 5:30 Grigoris Paouris
    6:00pm Dinner TBA

Sunday, March 15

  9:00 - 9:30 Coffee & Refreshments.
 9:30 - 10:30 Grigoris Paouris
10:30 - 10:45 Break
10:45 - 11:45 Alexandre Eremenko
11:45 - 12:30 Lunch in the MSB Library
 12:30 - 1:30 Grigoris Paouris
  1:30 - 1:45 Break
  1:45 - 2:45 Alexandre Eremenko