Abstracts for Analysis, Probability, Number Theory and their Interaction

Jeremiah Buckley (King's College London)
Fluctuations in the zeroes of stationary Gaussian processes

The zeroes of a stationary Gaussian process on the real line are a classical object, and the mean number of zeroes is given by the famous Kac-Rice formula. A formula in a similar spirit, due to Cramér-Leadbetter (65), computes the variance exactly. Unfortunately this expression is not very accessible, and it is difficult to get a good estimate for the size of the variance. We will propose an approximate formula for a general process, that computes the asymptotic growth of the variance. In particular we show that the variance always grows at least linearly for a non-trivial process. Work in progress with Eran Assaf and Naomi Feldheim.

Kristian Seip (NTNU, Trondheim)
The H^1 inequalities of Carleman and Hardy from a multiplicative point of view

This talk will be a survey of (mostly) recent work and open problems in the multiplicative setting of Dirichlet series, originating either in Carleman's inequality $\sum_{n=0}^{\infty} \frac{|c_n|^2}{n+1} \leq \|f\|_{H^1}^2$ or Hardy's inequality $\sum_{n=0}^{\infty} \frac{|c_n|}{n+1} \leq \pi \|f\|_{H^1}$, where $f(z) = \sum_{n=0}^{\infty} c_n z^n$ is an H^1 function in the unit disc. We will discuss issues of intrinsic interest to operator and function theory, as well as applications and connections to number theory.

Mikhail Sodin (Tel Aviv University)
Spectra of stationary processes on Z and polynomial approximation on the unit circle

The starting point my talk will be a striking spectral rigidity of finitely valued stationary processes on Z that says that if the spectral measure of the process has a gap in its support then the process is periodic. This result is intimately related with various areas of complex and harmonic analysis, probability theory and mathematical physics, and raises a variety of open problems. I will try to explain at least some of these connections.

The talk is based on the works with Alexander Borichev and Benjamin Weiss (arXiv:1701.03407) and with Alexander Borichev and Anna Kononova (arXiv:1902.00874, arXiv:1902.00872).

Nina Snaith (University of Bristol)
Zeros and moments: motivating random matrix theory through number theory

For 20 years we have known that average values of characteristic polynomials of random unitary matrices provide a good model for moments of the Riemann zeta function. Now we consider mixed moments of characteristic polynomials and their derivatives, calculations which are motivated by questions on the distribution of zeros of the derivative of the Riemann zeta function.