University of Crete
Departments of Mathematics and Applied Mathematics

Analysis Seminar

1:15pm, Tuesday, 14 February, 2017
Room A-303

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Ergodicity of the Liouville system implies the Chowla conjecture

The Liouville function assigns the value one to integers with an even number of prime factors and minus one elsewhere. Its importance stems from the fact that several well known conjectures in number theory can be rephrased as conjectural properties of the Liouville function. A well known conjecture of Chowla asserts that the signs of the Liouville function are distributed randomly on the integers, that is, they form a normal sequence of plus and minus ones. Reinterpreted in the language of ergodic theory this conjecture asserts that the "Liouville dynamical system" is a Bernoulli system. We prove that a much weaker property, namely, ergodicity of the "Liouville dynamical system", implies the Chowla conjecture. Our argument combines techniques from ergodic theory, analytic number theory, and higher order Fourier analysis.