THE UNIVERSITY OF HONG KONG

Institute of Mathematical Research
Department of Mathematics

Number Theory Seminar

The Ramanujan conjecture: from theory to applications

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Abstract

Originally predicted by Ramanujan in 1916 for the discriminant function, the Ramanujan conjecture is a very deep statement concerning the size of the Fourier coefficients of cusp forms. The generalized Ramanujan conjecture expects that a generic cuspidal irreducible unitary automorphic representation of a reductive group over a global field should be locally tempered. While this conjecture is largely open to-date, it is established for certain cases.

In this survey talk we shall review the current status of this conjecture and explain some novel applications of the proven cases to explicitly construct Ramanujan graphs and Ramanujan complexes, uniformly distributed points on spheres, and Golden Gate sets in quantum computing. The Ramanujan conjecture is closely tied to the Riemann Hypothesis. We shall also explain the connection between Ramanujan graphs/complexes and the Riemann Hypothesis satisfied by their associated zeta functions.

Date:	**July 23, 2019 (Tuesday)**
Time:	**10:30 – 11:30am**
Venue:	**Room 210, Run Run Shaw Bldg., HKU**

All are welcome