

ALGEBRA AND GEOMETRY SEMINAR

Speaker: David Nguyen (Queen's University)

Title: Multiple Clebsch–Gordan rule and applications to exponential sums

Abstract: The classical Clebsch–Gordan rule for $\mathfrak{sl}(2, \mathbb{C})$ gives the decomposition of tensor products of two irreducible representations into a direct sum of irreducibles. Irreducible representations of $\mathfrak{sl}(2, \mathbb{C})$ appear, for instance, as representations of the local monodromies on curves (coming from hyper-Kloosterman sheaves from number theory). An analogous rule for tensor products of three or more irreducible representations ought to be known, but I was unable to find a reference. In this talk, I will deduce this multiple Clebsch–Gordan rule of decomposing tensor products of three or more irreducible representations into irreducibles and apply this simple combinatorial result, through the heavy machinery of étale cohomology, to give an improvement on upper bounds of a certain class of exponential sums arising from Y. Zhang's proof of bounded gaps between primes. This is joint work with M. Roth.