Speaker: Tomoki Nakanishi
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Wednesday, September 14, 2016
4:00 PM
117 Hayes-Healy Hall

Title: Dilogarithms identities and cluster algebras

Abstract:

The dilogarithm function was introduced by Euler, and the function and its variations appear in several areas of mathematics, e.g., hyperbolic geometry, algebraic K-theory, conformal field theory, integrable systems. The function is remarkable in the sense that it satisfies a great variety of functional equations, including the celebrated pentagon identity, which we call dilogarithm identities. On the other hand, cluster algebras, introduced by Fomin and Zelevinsky, are a rather recently introduced combinatorial/algebraic structure originated in Lie theory. It was not originally intended, but it turns out that the dilogarithm is ``built-into" the cluster algebra structure. In particular, with each periodicity of mutations in a cluster algebra, one can associate a dilogarithm identity. Furthermore, the same story goes on for the quantum ones (quantum dilogarithm and quantum cluster algebras), generalized ones (dilogarithm of higher degree and generalized cluster algebras), and the quantum generalized ones (quantum dilogarithm of higher degree and quantum generalized cluster algebras). References 1. Rinat M. Kashaev, Tomoki Nakanishi, Classical and quantum dilogarithm identities, SIGMA 7 (2011) 102, 29 pages. 2. Tomoki Nakanishi, Quantum generalized cluster algebras and quantum dilogarithms of higher degrees, Theor. Math. Phys. 185 (2015) 1759--1768. 3. Tomoki Nakanishi, Rogers dilogarithms of higher degree and generalized cluster algebras, arXiv:1605.04777, 32 pages.