

ALGEBRA SEMINAR

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**Wednesday, January 18, 2012
1:00p.m., Room, HH-3017**

"Weyl groups of fine gradings"

Abstract:

Given a grading by an abelian group on a nonassociative algebra, we have two subgroups of the automorphism group of the algebra: the automorphisms that stabilize each component of the grading (as a subspace) and the automorphisms that permute the components. By the Weyl group of the grading, we mean the quotient of the latter subgroup by the former. In the case when the grading is the Cartan decomposition of a semisimple complex Lie algebra, this is the automorphism group of the root system, i.e., the classical extended Weyl group.

A grading is called fine if it cannot be refined. Over an algebraically closed field, a classification of fine gradings is known for matrix algebras, the algebra of octonions, the exceptional simple Jordan algebra (characteristic different from 2) and the simple Lie algebras of the series A, B, C, D (characteristic zero for D4 and different from 2 for all others) and of the exceptional types E6 (characteristic zero), F4 (characteristic different from 2) and G2 (characteristic different from 2, 3). I will present a recent joint work with Alberto Elduque where we compute the Weyl groups of fine gradings on the simple Lie algebras of the series A, B, C and D (except D4).