Boğaziçi
MATH COLLOQUIUM

Cohomological Invariants of Quadratic Forms

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Abstract: Let K be a field of characteristic different from 2, let G be a finite group and let L/K be a G-Galois extension. We attach to this extension the so called *trace form*. This is the G-quadratic form $q_L : L \to K$ defined by

$$q_L(x) = \mathrm{Tr}_{L/K}(x^2).$$

When the degree of L/K is odd, Bayer and Lenstra have proved that L has a normal and self-dual basis over K; therefore q_L is isometric to the unit form $< 1, \cdots, 1 >$. Their result does not generalize to extensions of even degree. This is the case we want to consider. In this talk, we recall the definition of the Hasse-Witt invariants of a quadratic form and we introduce the notion of 2-reduced groups. Using a formula of Serre and theorems of Quillen, we compute the Hasse-Witt invariants of q_L when the Galois group of L/K is 2-reduced. As a consequence, we obtain infinite families of Galois extensions L/K, having a trace form q_L isomorphic to the unit form. These results are part of a joint work with T. Chinburg, B. Morin and M.J. Taylor.

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