Pfister numbers for quadratic forms

Zinovy Reichstein
University of British Columbia

Abstract: Quadratic forms and their use in geometry and number theory have a long and distinguished history going back to ancient times. The algebraic theory is more recent. It originates from the work of Ernst Witt in the 1930s, who organized the non-degenerate quadratic forms over a field $K$ into what we now call the Witt ring of $K$. In the 1960s Albrecht Pfister introduced the basic building blocks of this ring, which we now call Pfister forms.

The $d$-h Pfister number $\text{Pf}_d(q)$ of a quadratic form $q$ is the smallest number of $d$-fold Pfister forms required to represent $q$. (Here I am assuming that $q$ is contained in the $d$-th power of the fundamental ideal.) This number is an important measure of the complexity of $q$. In this talk I will define all of the above terms, including “Witt ring”, “Pfister form” and “fundamental ideal”. I will then discuss a recent result, proved jointly with Patrick Brosnan and Angelo Vistoli, which shows that $\text{Pf}_3(q)$ can be surprisingly large.

Thursday, April 3, 2008, 4:00 pm
Mathematics and Science Center: W201

Refreshments will be served in the department lounge at 3:30PM

Mathematics and Computer Science
Emory University