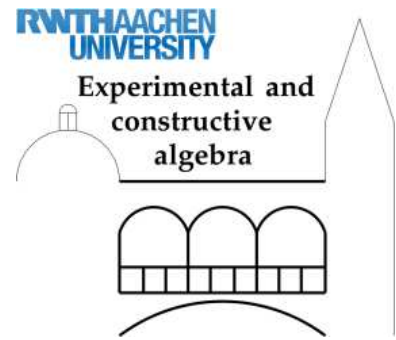


Graduiertenkolleg

# Experimentelle und konstruktive Algebra



## Kolloquiumsvortrag

Freitag, 6. Mai 2011, 14:00 Uhr, Hörsaal III

**MAGDALENA CAUBERGH** (Universitat Autònoma de Barcelona, Spanien):  
*The center problem and limit cycles*

In this talk attention goes to two of the main classical problems in the qualitative theory of real planar polynomial vector fields: the determination of their limit cycles, i.e. isolated periodic orbits, and the center-focus problem, i.e. the problem to decide whether a singular point is a center or a focus.

In a first part we introduce algebraic, geometric and analytic techniques to describe centers including methods based on normal forms, Lyapunov quantities or focal values, Bautin Ideal and Melnikov functions. We illustrate these techniques for polynomial vector fields induced by Liénard equations (i.e. a class of second order differential equations).

In a second part attention goes to limit cycles, in particular in the neighbourhood of centers. We show how the techniques previously mentioned can be used to describe bifurcations of limit cycles such as Hopf-Takens and large amplitude limit cycle bifurcations.

We conclude the talk with some related open questions.

Wir laden alle Interessierten herzlich ein.

Ab 13:15 Uhr gibt es Kaffee und Tee in der Bibliothek des Lehrstuhl D für Mathematik.