ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Institut de mathématiques des sciences computationnelles et ingénierie
MATHICSE

SEMINAIRE D'ANALYSE NUMERIQUE

- ***MERCREDI 2 mars 2011 à 16h15 à la salle MA A110***

Prof. ***N. GUGLIELMI*** *(University of L'Aquila, Italy)* donnera une conférence intitulée:

"Fast computation of extremal points of the pseudospectrum and the distance to instability of a stable matrix"

Synopsis.

When studying the epsilon-pseudospectrum of a matrix, one is often interested in computing the extremal points having maximum real part or modulus. This is a crucial step, for example, when computing the distance to instability of a stable system.

Using the key property that the epsilon-pseudospectrum is determined via perturbations by rank-1 matrices, we derive different dynamical systems leading to the critical rank-1 perturbations associated with the extremal points of (locally) maximum real part and modulus. This approach also allows us to track the boundary contour of the pseudospectrum in a neighbourhood of the extremal points.

An important by-product of the method is that the knowledge of the critical rank-1 perturbation allows an inexpensive and direct computation of the derivative in the root-finding Newton process associated to the computation of the distance to instability of a stable system.

The method turns out to be fast in comparison with those previously proposed in the literature and appears to be promising in dealing with large-size, sparse problems.

The talk is based on joint works with Christian Lubich (University of Tuebingen) and Michael Overton (Courant Institute, New York University).

Lausanne, le 13 janvier 2011
Prof. Assyr Abdulle /nk

Les séminaires qui ont lieu à la Section de Mathématiques sont annoncés sur Internet
(http://memento.epfl.ch/cgi-bin/memento/select?memento=MATHS)