Centrum Zastosowań Matematyki

Instytut Matematyczny Polskiej Akademii Nauk

zapraszają na

SEMINARIUM CZM

wspólne z

KONWERSATORIUM DLA DOKTORANTÓW

W piątek, 11 czerwca 2010 roku o godz. 15.00

w IM PAN, ul. Śniadeckich 8, w sali 322 na III piętrze

Prof. Alexander G. Ramm

(Mathematics Department, Kansas State University)

wygłosi wykład

Dynamical systems method for solving operator equations

A general method, Dynamical Systems Method (DSM), for solving nonlinear and linear operator equations $F(u)=f$ is presented. This method consists of the construction of a dynamical system, that is, a Cauchy problem, $\dot{u}=\Phi(t,u)$, $u(0)=u_0$, which has the following three properties: 1) it has a global solution, i.e., its solution is defined on $[0,\infty)$, 2) there exists the limit $\lim_{t\to\infty} u(t)=u(\infty)$, 3) $F(u(\infty))=f$.

The choices of $\Phi(t,u)$ are proposed and the DSM is justified for wide classes of operator equations, including a) arbitrary solvable linear equations of the form $Au=f$ with densely defined closed linear operator A, b) for well-posed nonlinear equations, c) for ill-posed nonlinear equations with monotone operators, d) for operators F such that $A:=F'(u)$ satisfies some spectral assumption.

Convergence theorem is obtained for a DSM version of Newton's method for monotone operators for any initial approximation. A general approach to constructing convergent iterative schemes for solving well-posed nonlinear operator equations is described and convergence theorems are obtained for such schemes. Stopping rules for stable solution of ill-posed problems with noisy data are given.

References

[1] A. G. Ramm, *Dynamical systems method for solving operator equations*, Elsevier, Amsterdam, 2007.

[2] A. G. Ramm, *Inverse Problems*, Springer, New York, 2005.

[3] N. S. Hoang, A. G. Ramm, *Dynamical systems method for solving nonlinear equations with monotone operators*, Math. Comput. 79 (2010), 239–258.

Wykład poprzedzi półgodzinne spotkanie przy kawie i ciastkach.

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