

Research group on *Stochastic and Differential Equations*

IMAR Participants: V. Dragan, I. Molnar, T. Morozaan, L. Stoica, D. Tiba, C. Varsan.

Romanian Cooperations: Bucharest University, The Academy of Economic Studies Bucharest, The "Gh. Mihoc – C. Iacob" Institute for Mathematical Statistics and Applied Mathematics of the Romanian Academy (through two scientific seminars organized by IMAR and Bucharest University).

International Cooperations:

France: Maine University

Turkey: Middle East Technical University Ankara.

Workpackages involved: A1, C4.

Scientific Objectives:

- Maximum principles for parabolic quasilinear stochastic partial differential equations.

Main Scientific Results:

1. L. Denis, A. Matoussi, L. Stoica: *Maximum principle for parabolic quasilinear SPDE: a first approach*, preprint.

Research Activity:

- A. Matoussi has visited IMAR for scientific cooperation with Prof. L. Stoica (IMAR) on stochastic partial differential equations and gave two lectures at IMAR, as part of an emerging programme on Stochastic analysis and Financial mathematics.

Communications and Conferences:

1. A. Matoussi (Maine University, Le Mans): *SPDEs driven by nonlinear noise and BSDs*, two talks given at IMAR in May 2003.
1. A. Matoussi (Maine University, Le Mans): *Reflected BSDE's with monotonicity condition*, talk given at the 2004 IMAR Workshop (June 22, 2004).

Organization of:

- **International Conference:** "*Analysis and Optimization of Differential Systems* "

The Conference has been organized during the period September 10 – 14, 2002 in Constanta with the participation of the "Ovidius" University of Constanta. There have been a number of 80 participants, 32 of them from abroad (Europe and USA).

Main topics:

Ordinary and Partial Differential Equations	Shape Optimization
Semigroup Theory	Inverse Problems
Abstract Optimization Problems	Numerical Approaches
Optimal Control of Evolution Systems	Applications

The Proceedings of the Conference will be published by Kluwer Academic Publishers - an official publisher of IFIP.

Scientific Programme:

M.C. Anisiu (Cluj-Napoca):	PDE's in the inverse problem of dynamics
V. Anisiu (Cluj-Napoca):	Numerical eigenvalues and eigenvectors using DERIVE
N.C. Apreutesei (Iasi):	Existence and asymptotic behavior results for some difference equations associated with monotone operators
V. Arnautu (Iasi):	Preconditioners for the approximation of optimal control problems
L. Badea (Bucharest):	Convergence rate of a multiplicative Schwarz method for strongly nonlinear variational inequalities
V. Barbu (Iasi):	Stabilization of Navier-Stokes equations
A. Barbulescu (Constanta):	About a program for the calculus of Pade approximants
M. Batinetu-Giurgiu (Bucharest):	Decomposition on generators with applications to a boundary control problem for p-caloric equation, $p > 1$

- A. Bica (Oradea): On of a delay integral equation from biomathematics
- M.S. Blizorukova (Ekaterinburg): Positional modeling in a system with time delay
- T. Borangiu (Bucharest): Comments on a constrained optimization problem for differential robot manipulators at singular kinematics inversion of configurations
- F. Bucci (Firenze): Uniform stability of coupled systems of hyperbolic / parabolic PDE's with internal dissipation
- A. Buica (Cluj-Napoca): Existence of strong solutions of fully nonlinear elliptic problems
- J. Cagnol (Paris): Large free boundary conditions in intrinsic geometric shell models
- O. Carja (Iasi): Weakly decreasing systems in Hilbert spaces
- A. Cernea (Bucharest): Quasi-linear inclusions in nonseparable Banach spaces
- I. Chiorean (Cluj-Napoca): Parallel methods for solving PDE's
- I. Chueshov (Kharkov): Determining functionals for infinite dimensional dissipative systems
- C. Corduneanu (Arlington): Absolute stability of neutral systems
- S.O. Corduneanu (Iasi): On some cases of Cauchy problems
- G. Dimitriu (Iasi): Parameter estimations in nonlinear parabolic systems with time delay
- V. Dragan (Bucharest): Iterative procedures for stabilizing of Riccati type differential equations arising in stochastic control
- L.A. Fernandez (Santander): Determining a semilinear parabolic PDE from final data
- G. Freiling (Duisburg): Matrix Riccati equations and a class of rational matrix equations
- V. Glavan (Chisinau and Siedlce): Shadowing in contracting relations
- V. Gutu (Chisinau): Shadowing in contracting relations
- W. Hager (Gainesville): The dual active set algorithm for optimization and control
- J. Henry (Le Chesnay): Factorization of elliptic boundary value problems: the QR approach
- G. Isac (Kingston): Nuclear and full nuclear cones. Pareto efficiency and Ekeland type variational principles
- N. Jitarasu (Chisinau): On the Sobolev boundary value problem with regularized boundary conditions for elliptic equations
- A. Kowalewski (Cracow): Time optimal control of a hyperbolic system with boundary conditions involving time delays; On some optimization problem with non-quadratic criterion
- D. Lambadarie (Bucharest): Local stabilization for affine and bilinear control systems
- I. Lasiecka (Charlottesville): Controllability and stabilization of hybrid PDE systems
- D. Lozovanu (Chisinau): Optimal flow in dynamic networks with nonlinear cost functional
- V.I. Maksimov (Ekaterinburg): Method of extremal shift in problems of reconstruction of an input of parabolic variational inequalities
- L. Marinovici (Iasi): Flow invariance properties for a class of uncertain discrete time nonlinear systems
- M. Megan (Timisoara): Theorems of Neerven type for exponential unstability of evolution families
- St. Mirica (Bucharest): Differential properties of Lipschitz Hamiltonian and characteristic flow
- G. Morosanu (Iasi): Coupled viscous/inviscid compressible flows
- T. Morozan (Bucharest): Matrix Ricatti differential equations connected with stochastic control problems
- M. Muresan (Cluj-Napoca): Controllability of certain differential equations and inclusions
- P. Neittaanmaki (Jyvaskyla): Application of multicriteria optimization to optimal design and control problems
- S. Niculescu (Paris): On delay-dependent stability in lossless propagation modes. Additional dynamics and Liapunov-Krasovskii analysis
- V.E. Oltean (Bucharest): Two optimal control problems for hybrid systems - a comparative approach
- L. Pandolfi (Torino): Recursive source identification in thermal processes
- G. Pasa (Bucharest): The control of the Saffman-Taylor instability
- O. Pastravanu (Iasi): Usage of infinity norm for the characterization of componentwise stability
- A. Perjan (Chisinau): Singular perturbation of hyperbolic-parabolic type
- H. Petzeltova (Prague): Asymptotic behavior of solutions of a conserved phase-field system with memory
- Dan Polisevski (Bucharest): The Regularized Diffusion In Partially Fractured Porous Media
- D. Popescu (Craiova): Improved dynamic properties by feedback for systems with delay in control
- V. Prepelita (Bucharest): Generalized HO-Kalman algorithm for 2D continuous-discrete linear systems
- A. Profir (Chisinau): Mathematical and stochastic models of regulation processes of gene expression
- A. Ramos (Madrid): Multiple objective control of evolution systems and Nash equilibria

V. Rasvan (Craiova):	Control and stabilization of discretized systems with delay in control
C. Rocsoreanu (Craiova):	An overview on the local bifurcation in Fitz-Nagumo system
T. Roubicek (Prague):	Optimization of steady-state flow of incompressible fluids
V. Sima (Bucharest):	Fast numerical algorithms for Wiener systems identification
J. Sprekels (Berlin):	Modelling curved mechanical structures
R. Stavre (Bucharest):	Optimal control of nonstationary three dimensional micropolar flows
M. Sterpu (Craiova):	An overview on the local bifurcation in Fitz-Nagumo system
A. Stoica (Bucharest):	Design method for fault detection and identification problems
Ch. Tai (Bergen):	Level sets and total variation regularization for elliptic inverse problems
with discontinuous	coefficients
D. Tiba (Berlin and Bucharest):	Optimization of curved mechanical structures
R. Triggiani (Pisa):	Carleman/observability estimates without lower order terms: global
uniqueness and	observability in one shot
F. Troeltzsch (Berlin):	On error estimates for the optimal control of PDE's
M. Tucsnak (Nancy):	Optimal location of the actuators for some distributed control problems
V. Ungureanu (Targu Jiu):	Riccati equations of stochastic control and uniform observability in Hilbert spaces
C. Varsan (Bucharest):	Differential equations with stochastic perturbations including not
adapted solutions	
M. Voicu (Iasi):	Componentwise asymptotic stability induced by
symmetrical polyhedral time-dependent	constraints
I. Vrabie (Iasi):	Linear evolution equations with distributed spatial measures
C. Zalinescu (Iasi):	On the necessity of some constraint qualification conditions in convex
programming	

- **The International Workshop “*Differential Systems and Financial Mathematics*”, Bucharest, September 15-23, 2003.** This scientific meeting was organized in collaboration with colleagues from France and Turkey and had 26 participants. Generally each day was focussed on one subject and one speaker. We consider it as initiating a series of future meetings at IMAR on similar subjects.

Plenary Talks:

- H. Korezlioglu: Stochastic calculus in continuous time markets
- B. Lapayre: Methods of PDE in finance
- B. Lapayre: Monte-Carlo methods
- V. Bally: Interest rate models
- E. Temam: Calibration
- Monique Jeanblanc: Optimization, Option markets, Incomplete markets
- C. Varsan: On the parametrization of some random variable in a financial market
- L. Stoica: Quasi-linear parabolic SPDE
- .Dragan, T. Morozan: Stabilization and Riccati equations
- C. Varsan: Implication of Kolmogorov equations in solving european option problem.