

**VIOREL BARBU**

**PUBLICATIONS**

**BOOKS AND MONOGRAPHS**

[1] Nonlinear Semigroups and Differential Equations in Banach Spaces, Noordhoff, Leyden 1975.

[2] Convexity and Optimization in Banach Spaces (Joint with T. Precupanu), Sijthoff@Noordhoff, Leyden 1978 ; second edition D.Reidel, Dordrecht 1986.

[3] Hamilton - Jacobi Equations in Hilbert Spaces (Joint with G.Da Prato), Pitman Research Notes in Mathematics 86, London - Boston 1983.

[4] Optimal Control of Variational Inequalities, Pitman Research Notes in Mathematics 100, London - Boston 1984.

[5] Differential Equations (romanian), Junimea, Iasi 1985.

[6] Analysis and Control of Nonlinear Infinite Dimensional Systems, Academic Press, Boston, New York,1993.

[7] Boundary Value Problems for Partial Differential Equations (in romanian), Editura Academiei, Bucharest 1994.

[8] Mathematical Methods in Optimization of Differential Systems Kluwer Academic Publishers, Dordrecht 1994.

[9] Partial Differential Equations and Boundary Value Problems, Kluwer Academic Publishers, Dordrecht 1998.

**PROCEEDINGS**

[1] Differential Equations and Control Theory,V.Barbu ed., Longman Scientific and Technical, London - New York, 1992.

[2] Optimization, Optimal Control and Partial Differential Equations, V.Barbu, F.Bonnans, D.Tiba eds., Birkhauser, Basel - Boston - Berlin, 1992.

[3] Proceedings IFIP Conference on Control 2002, Birkhauser, Basel - Boston, 2002.

## CONTRIBUTED PAPERS

- [1] Sur une equation integrale non-lineaire, Anal.St.Univ. "Al.I.Cuza", T X(1964),61-65.
- [2] Operateurs differentiels partiellment hypoelliptiques, Anal.St.Univ. "Al.I.Cuza",T XII(1966),293-301.
- [3] Solutions presque-periodiques pour un systeme d'equations lineaires aux derivees partielles,Ricerche di Matematica,vol.XV(1966), 207-222.
- [4] Sur la propagation de l'analyticite des solutions des equations differentielles a coefficients constants, Revue Roumaine Math. Pures Appl. 10 (1967), 1419-1423.
- [5] Sur la propagation de l'hypoanaliticite des equations a coefficients constants, C.R.Acad.Sci.Paris, T.266 (1988), 419-421.
- [6] On the regularity of solutions of linear partial differential equations, Anal.St.Univ."Al.I.Cuza", T.XIV (1968), 321-325.
- [7] Partially hypoanalytic distributions and pseudo-differential operators, Atti Acad.Naz.Lincei vol.XLV (1968), 84-90.
- [8] On the regularity of weak solutions of abstract differential equations in Hilbert spaces,Atti Acad.Naz.Lincei vol.XLV(1968), 129-134.
- [9] Les semi-groupes distribution differentiables, C.R.Acad.Sci. Paris, t.267 (1968), 875-878.
- [10] Ecuatii functionale neliniare in spatii Banach si probleme la limita, Studii si Cercetari Matematice, T.20(1968), 137-164.
- [11] On the propagation of hypoanaliticity for solutions of differential equations with constant coefficients, Revue Roumaine Math. Pures Appl., 2 (1969), 157-167.
- [12] On local properties of pseudo-differential operators, Acta Scient.Math., t.XXX(1969), 263-270.
- [13] Differentiable distribution semigroups, Annali Scuola Normale Sup. Pisa, vol.XXIII (1969), 413-429.
- [14] On the regularity of the weak solutions of abstract differential equations,Osaka J. Math., 6(1969), 49-56.
- [15] Sur la perturbation du generateur d'un semi-groupe non lineaire de contraction, C.R.Acad.Sci.Paris, t.268 (1969), 1544-1547.

- [16] Weak solutions for nonlinear functional equations in Banach spaces, *Annali Mat.Pura Applicata*, vol.LXXXVII (1970), 87-110.
- [17] On the surjectivity of multi-valued dissipative mappings, *Bolletino Unione Mat.Ital.*, 5(1970), 817-826 (Joint with A.Cellina.)
- [18] Dissipative sets and nonlinear perturbed equations in Banach spaces, *Annali Scuola Normale Sup.Pisa*, vol. XXVI (1972), 365-390.
- [19] Sur un probleme aux limites pour une classe d'equations differentielles nonlineaires abstraites du deuxieme order en t, *C.R .Acad. Sci.Paris*, t.274 (1972), 459-462.
- [20] A class of boundary problems for second order abstract differential equations, *J.Faculty Science Univ.Tokyo*, vol.19(1972), 295-319.
- [21] Continuous perturbations of nonlinear m-accretive operators in Banach spaces, *Bolletino Unione Mat.Ital.*, 6 (1972),270-278.
- [22] Asymptotic behaviour of linear integro-differential systems, *Trans. Amer. Math.Soc.*, vol.173 (1972), 277-288 (Joint with S.Grossman.)
- [23] Regularity properties of some nonlinear evolution equations, *Revue Roumaine Math.Pures Appl.*, 16(1973), 1503-1514.
- [24] On the regularity of solutions of hyperbolic nonlinear equations, *Annali Mat.Pura Applicata*, vol.XCV (1973), 303-319.
- [25] Integro-differential equations in Hilbert space, *Anal. St. Univ. "Al. I. Cuza", T.XIX* (1973), 365-383.
- [26] Existence theorems for a class of two point boundary problems, *J.Diff.Equations*, vol.17 (1975),236-257.
- [27] Convex control problem of Bolza in Hilbert spaces, *SIAM J.Control*, 13 (1975), 751-771.
- [28] On the control problem of Bolza in Hilbert spaces, *SIAM J. Control*, 13 (1975), 1062-1076.
- [29] Nonlinear Volterra equations in Hilbert space, *SIAM J.Math. Anal.*, 5(1975),728-741.
- [30] Constrained control problems with convex cost in Hilbert spaces, *J.Math.Anal.Appl.*,56(1976),502-528.

- [31] Nonlinear Volterra integro-differential equations in Hilbert spaces, Conferenze Seminario Matematico Bari, 143 (1976).
- [32] Convex control problems for linear differential systems of retarded type, Ricerche di Matematica, XXVI(1976), 502-528.
- [33] Nonlinear boundary value problems for a class of hyperbolic systems, Revue Roumaine Math.Pures Appl., 22(1977),155-168.
- [34] On a nonlinear Volterra equation on a Hilbert space, SIAM J. Math. Anal., 8 (1977), 346-355.
- [35] Ecuatii neliniare de evolutie pe spatii Hilbert, Analiza neliniara si aplicatii, 115-179, D.Pascali ed., Editura Academiei,Bucuresti 1977.
- [36] Hamiltonian systems in a neighborhood of a saddle point, Trans. Amer.Math.Soc.,245(1978),291-307.
- [37] Convex control problems and hamiltonian systems on an infinite interval,SIAM J.Control &Optimiz.,16(1978),687-702.
- [38] Semilinear integro-differential equations in Hilbert spaces, J. Math. Anal. Appl., 67(1979), 452-475. (Joint with M.A.Malik.)
- [39] Existence for nonlinear Volterra equations in Hilbert spaces, SIAM J.Math.Anal.,10(1979),552-569.
- [40] Degenerate nonlinear Volterra integral equations in Hilbert spaces, Volterra Equations, Lectures Notes in Math., vol.137, S.Londen ed., 2-23, Springer-Verlag,Berlin (1979).
- [41] Local existence for a nonlinear operator equations arising in synthesis of optimal control,Numerical Funct.Anal.&Optimiz.,1(1979),665-677. (Joint with G.Da Prato.)
- [42] Global existence for a nonlinear operator equation arising in synthesis of optimal control ,Nonlinear Anal. ,4(1980),1157-1166.(Joint with G.Da Prato.)
- [43] Boundary control problems with convex cost criterion, SIAM J. Control and Optimiz.,18(1980),227-254.
- [44] Necessary conditions for boundary control problems governed by parabolic variational inequalities, Anal.St.Univ. "Al.I.Cuza" ,XXVI(1980),47-66.
- [45] Necessary conditions for nonconvex distributed control problems governed by elliptic variational inequalities, J. Math. Anal. Appl., 80 (1981), 566-597.

[46] Necessary conditions for distributed control problems governed by parabolic variational inequalities ,SIAM J.Control&Optimiz.,19(1981),64-86.

[47] Global existence for the Hamilton-Jacobi equations in Hilbert spaces, Annali Scuola Norm. Sup.Pisa, VIII(1981), 257-284. (Joint with G.Da Prato.)

[48] Existence and approximation for stationary Hamilton-Jacobi equations, Nonlinear Anal., 5(1981), 1213-1224. (Joint with G.Da Prato.)

[49] Existence for a nonlinear hyperbolic system , Nonlinear Anal. , 5(1981), 341-353.(Joint with G.Morosanu.)

[50] A semigroup approach to an infinite delay equation in Hilbert space, Abstract Cauchy Problems and Functional Differential Equations, F.Kappel et al.eds.,Research Notes in Mathematics 48,Pitman,Boston.London,1981.

[51] Boundary control problems with nonlinear state equations , SIAM J.Control &Optimiz.,20(1982),125-143.

[52] Necessary conditions for control problems governed by nonlinear partial differential equations,Nonlinear Partial Differential Equations, 19-47, College de France Seminar vol.II, Brezis and Lions eds.,Research Notes in Mathematics, 60, Pitman, Boston, London, 1982.

[53] Invariant manifolds for Hamiltonian systems in Hilbert spaces, Evolution Equations and Their Applications, 1-15,Kappel et al.eds., Research Notes in Mathematics 68, Pitman, Boston, London,1982.

[54] Optimal feedback controls for a class of nonlinear distributed parameter systems,SIAM J.Control& Optimiz.,21(1983),871-894.

[55] Boundary control of some free boundary problems, Control Theory for Distributed Parameter Systems,F.Kappel et al.eds., 45-59 ,Lectures Notes in Control and Information Sciences,Springer-Verlag ,Berlin.Heidelberg. New York,1983.

[56] A variational inequality modelling the Non-Fourier melting of a solid, Anal. St. Univ."Al. I. Cuza",T.XXVIII (1983), 35-42.

[57] Existence and uniqueness of the dynamic programming equation in Hilbert space, Nonlinear Anal., 7 (1983), 283-299. (Joint with G. Da Prato and C.Popa.)

[58] Hamilton-Jacobi equations and synthesis of nonlinear control processes in Hilbert spaces, J. Differential Equations, vol.48 (1983), 350- 372. (Joint with G.Da Prato.)

[59] Necessary conditions for multiple integral problem in the calculus of variations, Math.Annalen, 260(1983),175-189.

[60] Optimal feedback controls for semilinear parabolic equations, *Mathematical Theories of Optimization*, J.P.Cecconi ed.,43-70,*Lectures Notes in Mathematics* 979 (1983), Springer-Verlag,Berlin, Heidelberg, New York.

[61] Solution of the Bellman equation associated with an infinite dimensional stochastic problem ,*SIAM j.Control Optimiz.*,21(1983),531- 550.

[62] The time optimal control problem for parabolic variational inequalities, *Applied Math.& Optimiz.*,22(1984),43-70.

[63] Global existence for Hamilton-Jacobi equations in Hilbert spaces, *Revue Roumaine Math.Pures Appl.*, 29(1984),85-101.

[64] The time optimal control of variationa inequalities:Dynamic programming and the maximum principle, *Recent Mathematical Methods in Dynamic Programming*, 1-19,Capuzzo Dolceta ed., *Lectures Notes in Math.*1119, Springer - Verlag ,1985.

[65] Hamilton-Jacobi equations in Hilbert spaces; variational and semigroup approach, *Annali Mat.Pura ed Applicata*, 142(1985),303-349.(Joint with G.Da Prato.)

[66] Optimal control for free boundary problems, *Conferenze Seminario Matem. Bari*, 206 (1985).

[67] A note on a Hamilton-Jacobi equation in Hilbert space, *Nonlinear Anal.*, 9 (1985), 1337-1345.

[68] A semigroup approach to Hamilton-Jacobi equation in Hilbert space, *Semigroup Theory and Applications*, 9-18, *Research Notes in Mathematics* 141, Longman-Pitman, Boston, London,1986.

[69] Existence for minimization problem in Banach spaces with some applications, *J.Math.Anal.Appl.*, 121(1987),96-108 (joint with T.Seidman.)

[70] The time optimal problem for a class of nonlinear systems, *Control Problems for Systems Described by Partial Differential Equations*, 16-39, Lasiecka and Triggiani eds., *Lecture Notes in Control and Information Science* 97, Springer-Verlag, Berlin, New York, 1987.

[71] Bang-bang controllers for an optimal cooling problem, *Control and Cybernetics*,16(1987),91-102.(Joint with N.Barron.)

[72] The necessary conditions for optimal control in Hilbert space, *J. Math. Anal. Appl.*, 133(1988), 151-162. (Joint with N.Barron and R.Jensen.)

[73] Approximation of the Hamilton - Jacobi equations via Lie-Trotter product formula, *Control Theory and Advanced Technology*, 4 (1988), 189-208.

[74] A product formula approach to nonlinear optimal control problems, *SIAM J. Control Optimiz.*, 29 (1988), 497-520.

[75] A semigroup approach to Hamilton-Jacobi equations in Hilbert spaces, *Studia Univ. Babes-Bolyai, Mathematica*, XXXIII(1988), 63-78.

[76] Distributed parameter systems, Variational inequalities, Optimal control of variational inequalities, *Encyclopedia of Control and Systems*, 1182-1186, 5031-5036, 5036-5041, M. Singh ed., Pergamon Press, London 1988.

[77] Controlling the spread of a class of epidemics, *Appl. Math. Optimiz.*, 20(1989), 297-318. (Joint with V. Arnautu and V. Capasso.)

[78] The inverse one phase Stefan problem, *Differential and Integral Eqns.*, 3 (1990), 209-218.

[79] The dynamic programming equation for the time optimal control problem in infinite dimension, *SIAM J. Control Optimiz.*, 29 (1991), 445-456.

[80] The approximate solvability of the inverse one Stefan problem, *Numerical Problems for Free Boundaries*, 33-43, Neitnammakki ed., Birkhauser, Basel, 1991.

[81] The fractional step method for the nonlinear distributed control problem, *Differential Equations and Control Theory*, 7-17, V. Barbu ed., *Research Notes in Mathematics* 250, Pitman-Longman, Boston, London, 1991.

[82] Optimal design of domains with free boundaries, *SIAM J. Control Optimiz.*, 29 (1991), 623-637. (Joint with A. Friedman.)

[83] Feedback controllability of the free boundary of the one phase Stefan problem, *Different. Integral Eqns.*, 4 (1991), 225-239. (Joint with G. Da Prato and J.P. Zolessio.)

[84] Boundary controllability for the coincidence set in the obstacle problem, *SIAM J. Control Optimiz.*, 29(1991), 1150-1159 (Joint with D. Tiba.)

[85] Approximating optimal control for elliptic obstacle problem by monotone iteration scheme, *Numerical Funct. Anal. Optimiz.*, 12(1991), 429-442 (Joint with Ph. Korman.)

[86] Null controllability of first order quasilinear equations, *Different. Integral Eqns.*, 4 (1991), 673-681.

[87] Existence for implicit differential equations in Banach spaces, *Rend. Mat. Acad. Naz. Lincei*, 3(1992), 203-215 (Joint with A. Favini.)

[88] A representation formula for the solutions to operator Riccati equation, *Different. Integral Eqns.*,5 (1992), 821-830. (Joint with G.Da Prato.)

[89] Approximating some nonlinear equations by fractional step scheme, *Different. Integral Eqns.*,6(1993),15-26.(Joint with M.Iannelli.)

[90] Optimal control with two point boundary conditions, *JOTA*, 77 (1993), 51-78. (Joint with N. Pavel.)

[91] State space approach to nonlinear H - control, *Control and System Letters*, 21(1993), 65-72.

[92] A variational approach to a free boundary problem arising in electrophotography, *Numer. Funct. Anal. Optimiz.*, 14(1993), 1-14. (Joint with S.Stojanovic.)

[93] Approximating optimal control problems governed by variational inequalities, *Numer. Funct. Anal. Optimiz.* 15 (1994), 489-502. (Joint with P. Neittanmaki and A. Niemisto.)

[94] A penalty method for the identification of nonlinear elliptic differential operator, *Numer.Funct.Anal.Optimiz.*, 15(1994),503-530. (Joint with P.Neittanmaki and A.Niemisto.)

[95] Convergence of solutions of implicit differential equations, *Different. Integral Eqns.*, 7 (1994), 665-688. (Joint with A.Favini.)

[96] H - boundary control with state feedback : the hyperbolic case, *SIAM J. Control Optimiz.*, 32 (1994),1023-1035.

[97] The H - problem with control constraints, *SIAM J. Control Optimiz.*, 32(1994), 952-964.

[98] The H - problem for infinite dimensional semilinear systems, *SIAM J.Control Optimiz.*, 33(1995),1017-1027.

[99] Identification of nonlinear elliptic equations, *Appl.Math. Optimiz.*, vol.33(1996), 139-168. (Joint with K .Kunisch.)

[100] Optimal feedback controllers for periodic convex control problems, *NoDEA*, 3 (1996), 35-54.

[101] Periodic optimal control in Hilbert space, *Appl. Math. Optimiz.*, 33(1996), 169-188. (Joint with N.Pavel.)

[102] Identification of nonlinear parabolic equations, Control Theory and Advanced Technology ,vol.10(1995), 1959--1980 (Joint with K.Kunisch.)

[103] Periodic solutions for a second order semilinear Volterra equation, Theory and Applications of Nonlinear Operators of Accretive and Monotone Type, 1-14, A. Kartsatos ed., Lectures Notes in Pure and Applied Mathematics 178, M.Dekker 1996. (joint with S. Aizicovici.)

[104] Periodic solutions to nonlinear one dimensional wave equations with x-dependent coefficients, Trans. Amer. Math. Soc., (Joint with N. Pavel.)

[105] Control and estimation of the boundary heat transfer function in Stefan problems, Mathematical Modelling and Numerical Analysis, vol. 30 (1996), 671--710. (Joint with K.Kunisch).

[106] Optimal control of the one dimensional wave equation, Appl. Math. Optimiz. 35 (1997), 77--90.

[107] An inverse problem for the one dimensional wave equation, SIAM J.Control Optimiz., vol. 35 (1997), 1544--1556 (Joint with N.Pavel.)

[108] Optimal control of linear resonant systems in Hilbert spaces, SIAM J. Control Optimiz., vol.35 (1997), 2137--2156.

[109] Feedback control of dependent Stokes flows, SIAM Philadelphia 1998, Sritharan ed.

[110]  $H^\infty$  control theory of fluids dynamics,Proc.Royal Society London A(1998) 454, 3009-3033 (Joint with S.Sritharan.)

[111] Semilinear periodic control problems, Revue Roumaine Math.Pures Appl.,1998.

[112] Abstract periodic Hamiltonian systems, Advances in Diff. Eqns., vol 1, 4 (1996), 675-688.

[113] The time optimal control of Navier-Stokes equations, Systems and Control Letters , 30 (1997), 93--100.

[114] Periodic solutions to one dimensional wave equation with piecewise constant coefficients, Journal of Different. Equations, vol.112 (1996), 319--337. (Joint with N.Pavel)

[115] Optimal control of thermal conductivity of a rod under periodic conditions, Ricerche di Matematica, vol.XLV (1996), 205-- 217. (Joint with N.Pavel.)

- [116] Optimal control of population dynamics, JOTA, 102(1999), 1-14 (jointly with M.Iannelli).
- [117] Exact controllability of the superlinear heat equation, Applied Math. Optimiz., (2, 2000, 127--152).
- [118] Internal null controllability of nonlinear heat equation, (ESAIM COCV), 6 (2001), 271-280. (Joint with S.Anita).
- [129] The controllability of the heat equation with memory, Differential and Integral Equations 13 (2001), 1393-1412 (Jointly with M.Iannelli).
- [120] Riccati equations for boundary control systems, Nonlinear Analysis Theorie and Applications, 40 (2000), 105-129. (Joint with I.Lasiecka and R.Triggianni)
- [121] Carleman inequalities and controllability of stochastic heat equations, joint with A.Rascanu and M.Tessitore, Appl. Math. Optimiz. 5(2003), 1-20.
- [122] Internal stabilization of Semilinear Parabolic Systems, J. Math. Anal. Appl. 285 (2003), 387-407. (Jointly with G. Wang).
- [123] Flow invariance preserving feedback controllers for the Navier-Stokes equations, J.Math.Anal.Appl. 255 (2001), 281-307 (jointly with S.S.Sritharan)
- [124] Flow invariant closed sets with respect to nonlinear semigroups flows, NODEA, 10(2003), 57-72 (jointly with N.Pavel).
- [125] Exact controllability of MHD equations, Comm Pures Appl. Math, 56 (2003),732-783 (jointly with C.Popa et al).
- [126] The two phase stochastic Stefan problem, Probab.Theory Related Fields, 124(2002), 544-560 (jointly with G. Da Prato).
- [127] Controllability of parabolic and Navier-Stokes equations, Scientiae Math. Japonicae, Vol.56 (2002),143-211.
- [128] Local controllability of the phase field system, Nonlinear Analysis, 50(2002), 363-372.
- [129] Feedback stabilizations of Navier-Stokes equations, ESAIM COCV 9(2003), 197-207.
- [130] On the controllability of the Lotka-McKendrick Model of Population Dynamic, J. Math. Anal. Appl., 253(2001), 142-165. (Jointly with M.Iannelli, M.Martcheva).

[131] The Kolmogorov equation for stochastic variational inequalities, Probability Theory Rel.Fields\ (to appear) (jointly with G.Da Prato).

[132] Elliptic problems with unbounded drift coefficients, Diff. Integral Equations, 16 (2003), 829-840. (jointly with G.Da Prato).

[133] Controlling the volumetric water content discontinuity in a stratified unsaturated soil, In : Nonlinear Analysis and Applications: To V. Lakshmikantham on his 80th birthday, (Eds. R.P. Agarwal, D. O'Regan), Kluwer Academic Publishers, vol. 1, 241-258, 2003. (joint with G. Marinoschi).

[134] Existence for a time dependent rainfall infiltration model with a blowing up diffusivity, Nonlinear Analysis: Series B Real World Applications, 5, 2, 231-245, 2004 (joint with G. Marinoschi).

[135] Internal stabilization of Navier-Stokes equations with finite-dimensional controllers, Indiana Univ. Math. J. 53, 5, 1443-1494, 2004 (joint with R. Triggiani).

[136] The Neumann problem on unbounded domains and stochastic variational inequalities, Comm. P.D.E. (joint with G. da Prato)

[137] The stochastic porous media, J. Funct. Anal. (joint with V. Bogachev, M. Roeckner)

[138] Boundary stabilization of Navier-Stokes equations, Memoires A.M.S. (joint with I. Lasiecka, R. Triggiani)

[139] On nonlinear wave equation with degenerate damping and source term, Trans. Amer. Math. Soc. (joint with I. Lasiecka, A. Rammaba)