The Scientific Contribution of Nikolai D. Botkin *

Paris, 1993.

The workshop "Mathematical Modelling and Scientific Computing: Focus on complex processes and systems" held on November 19-20, 2020, at the Technical University of Munich, was dedicated to Nikolai Dmitrievich Botkin who passed away on September 14, 2019. In this article, we give a short description of the most important scientific results and a complete list of his publications.

Nikolai Dmitrievich Botkin was born on March 22, 1956 in Sysert, Sverdlovsk Region (USSR) to the father Dmitrii Sergeevich Botkin who taught mathematics and the mother Matrena Samuilovna Afanasenko who taught physics. After graduating from the Faculty of Mathematics and Mechanics of the Ural State University in Sverdlovsk, he was employed in the Dynamical Systems' Division of the Institute of Mathematics and Mechanics of the Ural Branch of the USSR Academy of Sciences (Sverdlovsk).

The scientific research of N. D. Botkin during the period of his work at the Institute of Mathematics and Mechanics (from 1978 to 1992) was devoted to the theory and numerical methods of differential games. Nikolai Botkin obtained theoretical results in the field of positional optimal control and constructing value functions [4], [5], [8], [10], [199], [200], [207], [216], a posteriori estimates for the numerical construction of solutions to differential games [3], [6], [77], [139], [141], and developed the first algorithms for calculating stable bridges in linear differential games [12], [76], [82], [106], [146], [201], [203], [204], [209], [211]–[214], [218], [219].

At the age of 27, in 1983, Nikolai defended his PhD thesis "Numerical solution of linear differential games" [1], [2]. During the decade 1982–1992, the methods developed by him were successfully applied [7], [9], [13], [16], [78]–[81], [107], [140], [142]–[145], [202], [205], [206], [208], [210], [215], [217] to the problems of aircraft control under wind disturbances in the framework of cooperation with the Academy of Civil Aviation in Leningrad, Russia. A method of aircraft landing control relying on switching lines was patented [104] in 1988. In the early 90s, based on an analysis of the asymptotic behavior of solutions to nonlinear differential games, he proposed a novel algorithm for computing the discriminating kernel of differential inclusion [11]. This algorithm was later on effectively implemented [46] in terms of level sets, which allowed to use it for solving many applied problems.

In 1992, Nikolai received a scientific grant from the Alexander von Humboldt Foundation and worked for a year at the University of Würzburg, and for the next six months at the Technical University of Munich. During this period, he kept working on differential games [14], [83], [147], [148], [150], and was engaged in the development of new effective algorithms in the field of convex optimization and linear and quadratic programming [15], [17], [84], [149], [151], [152], [220], [221], continuing this work in later years [26], [31]. In particular, a very effective numerical algorithm for finding Chebyshev center of a finite point set in the Euclidean space R^n was created, which is often used by researchers in various scientific fields.

From August 1993 to January 1999 Nikolai Botkin worked at the Technical University of Munich: until March 1994 as a Humboldt Fellow in the Division of Higher and Numerical Mathematics, and since March 1994 as a researcher in the Division of Applied Mathematics. In line with the scientific focus of the Division of Applied Mathematics, which was primarily on mathematical models of complex physical processes, he completed the works on identification of unknown parameters both of nonlinear heat conductivity equations [18], [109], [110] and of models describing phase transitions in shape memory alloys [108], [155], [222].

In the years 1997–2002, within the framework of the DFG-project "Adaptive materials in real-time optimization" Nikolai was engaged in research of problems related to oscillations excited by piezoelectrics in thin plates. Along with a theoretical study of thin plate models excited by piezoelectric patches [19], [20], [111], [112], [153]–[156], [159], [223], [224], including homogenized variants of the models [21], [23], [85], [86], [113], [157], [158], [160], [161], as the number of piezoelectric patches tends to infinity, he designed and implemented active real-time controls which provide the desired performance of flexible constructions subjected to varying disturbances [87], [225]. Participation in this project continued after moving in early 1999 to Bonn for work at the multidisciplinary research center CAESAR (Center of Advanced European Studies and Research). For seven and half years, he took part in numerous theoretical and applied projects. These included:

- Nonlinear interactions in piezoelectric excited surface waves (2001–2004)
- Microbalance Array Mass Spectrometry for Proteomics (2001–2004)
- Tire Sensor (2000–2004)
- Flexible Microrobot for Scanning Electron Microscopy (2000–2004)
- Shape Memory Composites for Orthodontic Archwires (2002–2005)
- Distributed Simulation of Complex Technological Systems (2004–2006)
- Elasto-Optical Biosensor on the Nanostructural Base (2004–2006)
- Safe Production and Use of Nanomaterials (2006–2007).

The work on these projects motivated the creation and substantiation of new mathematical models, the development of efficient algorithms and numerical methods. In particular, not only was a mathematical model of an acoustic biosensor, a multi-layered structure consisting of anisotropic piezoelectric and isotropic layers, created [24], [114], [162], [165], [166], [169], [171], [174], but also effective numerical methods and corresponding software [29], [118], [119], [123], [173], [177], [181], [183], [188] for the treatment of such multi-layered structures were developed. To take into account complex interactions with fluid of special biostructures (aptamers) that selectively bind biomolecules, a novel homogenization approach was elaborated [25], [27], [116], [117], [164], [167], [172], [178]. In this method, the interaction between the bristles of the aptamer molecules and the fluid is accounted for through an averaged material whose properties are derived using the passage to the limit in the model as the number of the bristles goes to infinity whereas their thickness goes to zero. It should also be noted that his contributions led to advances in the development of experimental devices such as the elasto-optical biosensor [45], [182], [187], the microfluidic reactor for producing nanoparticles [184], [189], the tire sensor [170], [179], and in the modeling composite materials and materials with memory [115], [120], [124], [163], [176], [180], [186], [226], as well as other important theoretical and experimental work [22], [28], [168].

Since August 2006, Nikolai Botkin was with the Division of Mathematical Modeling in the Mathematical Department at the Technical University of Munich. From 2006 to 2009 he was a leading researcher in the DFG project “Mathematical modeling and control in cryopreservation of living cells and tissues”. He developed and investigated models describing the processes of freezing and thawing of living cells and tissues and ingeniously applied the optimal control theory to the design of optimal cooling protocols that minimize the damaging effects caused by the release of the latent heat and by delayed freezing of intracellular fluid [32], [90], [185], [190], [230], [233]. N. D. Botkin was the co-author of the patent [105] for a device for freezing dental tissues. These and subsequent years, he also continued [35], [39], [129] his research on the numerical methods for solving differential games, developed grid algorithms for problems with nonlinear dynamics and state constraints [37], [40], [89], [193], [234]. He was among the first who applied numerical algorithms for solving differential games to biotechnological problems [237], [242], in particular, to the problem of propagation of surface acoustic waves in mathematical modeling of an acoustic biosensor [92], [121], [122], [162], [175], [227], [236], as well as for finding optimal protocols of freezing and thawing of living cells and tissues [34], [38], [88], [93], [194], [228], [231], [232].

In 2009–2012 Nikolai worked on a joint project "Modeling of CO_2 sequestration, including parameter identification and numerical simulation" of the Technical University of Munich and King Abdullah University of Science and Technology, Saudi Arabia. He obtained new results in the field of mathematical modeling of multiphase flows in porous medium, with accounting for the effects of hysteresis [41], [42], [126], [128], [195], [197].

His active work with graduate and postgraduate students of the Division of Mathematical Modeling is reflected in publications [30], [33], [44], [55], [125], [198], [229], where mathematical models for hydrodynamics, phase-field problems, transport in porous media, and economic problems have been developed.

Nikolai Botkin also paid great attention to research collaboration with the Poznan University of Technology, Poland. The joint results on inverse heat transfer problems were published in [36], [52], [191], [192]. Since 2012, he has been actively involved in a scientific cooperation with the Institute for Applied Mathematics, Far Eastern Branch of Russian Academy of Sciences (Vladivostok, Russia), on theoretical and numerical analysis of boundary-value problems of complex heat transfer [43], [47], [49], [53], [62], [68], [132], [196], [235], [239] and inverse and optimal control problems of complex heat transfer [48], [56]–[58], [63], [96], [131], [238].

Since 2013, Nikolay Botkin with great enthusiasm participated in the joint project "Mathematical modeling of cerebral blood circulation in premature infants with accounting for germinal matrix" of the University Clinic "rechts der Isar" and the Division of Mathematical Modeling. He applied the methods of differential game theory to the problems of modeling cerebral autoregulation [50], [67], [98], [130], [240], [241]. New models of cerebral blood circulation [60], [64], [65], [75], including models of oxygen transport [54], [69], [71], [136], [137], [243] in the brain were also developed and investigated with his direct involvement, and some peculiarities of cerebral blood circulation in premature infants were explored [70], [72], [73].

In 2015, he began work on the DFG project "Robust dynamic programming approach for solution of flight dynamics control problems" (joint with the Institute of Flight System Dynamics, Faculty of Mechanical Engineering, Technical University of Munich), as a leading project researcher. The algorithms for solving differential games, especially for the numerical construction of viability sets in nonlinear problems of high dimension were further developed [46], [51], [99], using novel parallelization technologies. This made it possible to solve problems with a phase vector dimension of 6–7, which was previously unattainable in differential games, and successfully apply the developed algorithms to problems of aircraft control at the stages of runway acceleration [94], take-off [91], [100], [102], [127], [133], [134], cruise flight [59], [61], [97], [135], and landing [95] under wind conditions, as well as for creating algorithms for generating dangerous wind disturbances [66], [101], [103]. Moreover, new robust control methods were designed [74], [100], [102], [138].

Nikolai Botkin continued to work actively until his sudden death. Many of his 243 publications are frequently requested and cited by other researchers. Numerical and analytical methods he developed for linear and quadratic programming, optimal control and differential game problems are used by theorists and practitioners. Nikolai Botkin's friends, colleagues, and students will remember him with tenderness and gratitude.

References

Theses

1. Botkin, N. D.: Numerical solution to linear differential games. PhD Thesis. Sverdlovsk, pp. 1–138 (1983) [in Russian]
2. Botkin, N.D.: Numerical solution to linear differential games. Author's summary of the PhD thesis. Sverdlovsk, pp. 1–13 (1983) [in Russian]

Papers in Peer-Reviewed Journals

3. Botkin, N.D.: Evaluation of numerical construction error in differential game with fixed terminal time. Probl. Control. Inf. Theory **11**(4), 283–294 (1982)
4. Botkin, N.D., Patsko, V.S.: Universal strategy in a differential game with fixed terminal time. Probl. Control Inf. Theory **11**(6), 419–432 (1982)
5. Botkin, N.D., Patsko, V.S.: Positional control in a linear differential game. Izv. AN SSSR. Tech. Kibernetika **4**, 78–85 [in Russian]. English transl. in Eng. Cybern. **21**(4), 69–76 (1983). https://doi.org/10.1016/0021-8928(84)90004-2
6. Botkin, N.D.: Approximation error in a linear-differential game. Avtomat. i Telemekh. **12**, 5–12 [in Russian]. English transl. in Autom. Remote Control **45**(12), 1537–1544 (1984)
7. Botkin, N.D., Kein, V.M., Patsko, V.S.: The model problem of controlling the lateral motion of an aircraft during landing. Prikl. Mat. Mekh. **48**(4), 560–567 [in Russian]. English transl. in J. Appl. Math. Mech. **48**(4), 395–400 (1984). https://doi.org/10.1016/0021-8928(84)90004-2
8. Botkin, N.D.: Optimal universal strategy in a linear differential game. Differ. Uravn. **25**(9), 1475–1480 [in Russian]. English transl. in Differ. Equ. **25**(9), 1029–1033 (1989)
9. Botkin, N.D., Kein, V.M., Patsko, V.S., Turova, V.L.: Aircraft landing control in the presence of windshear. Probl. Control Inf. Theory **18**(4), 223–235 (1989)
10. Botkin, N.D.: Differential pursuit game with mixed control constraints. Avtomat. i Telemekh. **6**, 12–19 [in Russian]. English transl. in Autom. Remote Control **53**(6), 793–800 (1992)
11. Botkin, N.D.: Asymptotic behavior of solutions of differential games. Viability domains of differential inclusions. Dokl. Akad. Nauk **325**(1), 16–19 (1992) [in Russian]. English transl. in Math. Dokl. **46**(1), 8–11 (1993)

12. Botkin, N.D., Ryazantzeva, E.A.: Algorithm for constructing a solvability set in a linear differential game of high dimension. Trudy Inst. Mat. i Mekh. UrO RAN **2**, 128–134 (1992) [in Russian]
13. Botkin, N.D., Zarkh, M.A., Keyn, V.M., Patsko, V.S., Turova, V.L.: Differential games and aircraft control problems in the presence of wind disturbance. Izvestiya Akademii Nauk. Teoriya i Sistemy Upravleniya **1**, 68–76 (1993) [in Russian]. English transl. in J. Comput. Syst. Sci. **32**(3), 110–117 (1994)
14. Botkin, N.: Approximation schemes for finding the value functions for differential games with nonterminal payoff functional. Analysis **14**(2-3), 203–220 (1994). https://doi.org/10.1524/anly.1994.14.23.203
15. Botkin, N.D., Turova-Botkina, V.L.: An algorithm for finding the Chebyshev center of a convex polyhedron. Appl. Math. Optim. **29**(2), 211–222 (1994). https://doi.org/10.1007/BF01204183
16. Patsko, V.S., Botkin, N.D., Kein, V.M., Turova, V.L., Zarkh, M.A.: Control of an aircraft landing in windshear. J. Optim. Theory Appl. **83**(2), 237–267 (1994). https://doi.org/10.1007/BF02190056
17. Botkin, N.D.: Randomized algorithms for the separation of point sets and for solving quadratic programs. Appl. Math. Optim. **32**(2), 195–210 (1995). https://doi.org/10.1007/BF01185230
18. Botkin, N.D.: Identification of unknown parameters for heat conductivity equations. Numer. Funct. Anal Optim. **16**(5-6), 583–599 (1995). https://doi.org/10.1080/01630569508816634
19. Botkin, N.D.: Estimation of parameters of a linear thin plate excited by a piezoelectric patch. Analysis **17**(4), 367–378 (1997). https://doi.org/10.1524/anly.1997.17.4.367
20. Hoffmann, K.-H., Botkin, N.D.: Oscillations of nonlinear thin plates excited by piezoelectric patches. Z. Angew. Math. Mech. **78**(7), 495–503 (1998). https://doi.org/10.1002/(SICI)1521-4001(199807)78:7<495::AID-ZAMM495>3.0.CO;2-W
21. Botkin, N.D.: Homogenization of an equation describing linear thin plates excited by piezopatches. Commun. Appl. Anal. **3**(2), 271–282 (1999)
22. Govorov, A.O., Kalameitsev, A.V., Rotter, M., Wixforth, A., Kotthaus, J., Hoffmann, K.-H., Botkin, N.: Nonlinear acoustoelectric transport in a two-dimensional electron system. Phys. Rev. B **62**(4), 2659–2668 (2000). https://doi.org/10.1103/PhysRevB.62.2659
23. Hoffmann, K.-H., Botkin, N.D.: Homogenization of von Kármán plates excited by piezoelectric patches. Z. Angew. Math. Mech. **80**(9), 579–590 (2000). https://doi.org/10.1002/1521-4001(200009)80:9<579::AID-ZAMM579>3.0.CO;2-2
24. Botkin, N.D., Turova, V.L.: Mathematical models of a biosensor. Appl. Math. Model. **28**(6), 573–589 (2004). https://doi.org/10.1016/j.apm.2003.10.012
25. Botkin, N.D., Hoffmann, K.-H., Meirmanov, A.M., Starovoitov, V.N.: Description of adhering with saturation using boundary conditions of hysteresis type. Nonlinear Anal. Theory Methods Appl. **63**(5-7), e1467–e1473 (2005). https://doi.org/10.1016/j.na.2005.01.044

26. Botkin, N.D., Stoer, J.: Minimization of convex functions on the convex hull of a point set. Math. Meth. Oper. Res. **62**(2), 167–185 (2005). https://doi.org/10.1007/s00186-005-0018-4
27. Hoffmann, K.-H., Botkin, N.D., Starovoitov, V.N.: Homogenization of interfaces between rapidly oscillating fine elastic structures and fluids. SIAM J. Appl. Math. **65**(3), 983–1005 (2005). https://doi.org/10.1137/S0036139903421572
28. Khludnev, A.M., Hoffmann, K.-H., Botkin, N.D.: The variational contact problem for elastic objects of different dimensions. Sib. Math. J. **47**(3), 584–593 (2006). https://doi.org/10.1007/s11202-006-0069-7
29. Botkin, N.D., Hoffmann, K.-H., Pykhteev, O.A., Turova, V.L.: Dispersion relations for acoustic waves in heterogeneous multi-layered structures contacting with fluids. J. Franklin Inst. **344**(5), 520–534 (2007). https://doi.org/10.1016/j.jfranklin.2006.02.026
30. Hoffmann, K.-H., Marx, D., Botkin, N.D.: Drag on spheres in micropolar fluids with non-zero boundary conditions for microrotations. J. Fluid Mech. **590**, 319–330 (2007). https://doi.org/10.1017/S0022112007008099
31. Stoer, J., Botkin, N.D., Pykhteev, O.A.: An interior-point method for minimizing convex functions on the convex hull of a point set. Optimization **56**(4), 515–524 (2007). https://doi.org/10.1080/02331930701421111
32. Hoffmann, K.-H., Botkin, N.D.: Optimal control in cryopreservation of cells and tissues. Adv. Math. Sci. Appl. **29**, 177–200 (2008)
33. Amler, T.G., Botkin, N.D., Hoffmann, K.-H., Meirmanov, A.M., Starovoitov, V.N.: Transport equation with boundary conditions of hysteresis type. Math. Methods Appl. Sci. **32**(17), 2177–2196 (2009). https://doi.org/10.1002/mma.1127
34. Botkin, N.D., Hoffmann, K.-H.: Control design in cryopreservation of living cells. Trudy Inst. Mat. i Mekh. UrO RAN **16**(5), 233–240 (2010)
35. Botkin, N.D., Ryazantseva, E.A.: Structure of viability kernels for some linear differential games. J. Optim. Theory Appl. **147**(1), 42–57 (2010). https://doi.org/10.1007/s10957-010-9706-1
36. Frąckowiak, A., Botkin, N.D., Ciałkowski, M., Hoffmann, K.-H.: A fitting algorithm for solving inverse problems of heat conduction. Int. J. Heat Mass. Transf. **53**(9-10), 2123–2127 (2010). https://doi.org/10.1016/j.ijheatmasstransfer.2009.12.039
37. Botkin, N.D., Hoffmann, K.-H., Mayer, N., Turova, V.L.: Approximation schemes for solving disturbed control problems with non-terminal time and state constraints. Analysis **31**(4), 355–379 (2011). https://doi.org/10.1524/anly.2011.1122
38. Botkin, N.D., Hoffmann, K.-H., Turova, V.L.: Optimal control of ice formation in living cells during freezing. Appl. Math. Model. **35**(8), 4044–4057 (2011). https://doi.org/10.1016/j.apm.2011.02.020
39. Botkin, N.D., Hoffmann, K.-H., Turova, V.L.: Stable numerical schemes for solving Hamilton-Jacobi-Bellman-Isaacs equations. SIAM J. Sci. Comput. **33**(2), 992–1007 (2011). https://doi.org/10.1137/100801068
40. Botkin, N.D., Hoffmann, K.-H., Mayer, N., Turova, V.L.: Erratum to: Approximation schemes for solving disturbed control problems with non-terminal time and state constraints. Analysis **32**(1), 85 (2012).

https://doi.org/10.1524/anly.2012.0943

41. Brokate, M., Botkin, N.D., Pykhteev, O.A.: Numerical simulation for a two-phase porous medium flow problem with rate independent hysteresis. Physica B Condens. Matter **407**(9), 1336–1339 (2012). https://doi.org/10.1016/j.physb.2011.06.048
42. Hoffmann, K.-H., Botkin, N.D.: Multiphase flows with phase transitions: Models and numerics. JP J. Heat Mass Transf. **6**(2), 73–86 (2012)
43. Kovtanyuk, A.E., Botkin, N.D., Hoffmann, K.-H.: Numerical simulations of a coupled radiative-conductive heat transfer model using a modified Monte Carlo method. Int. J. Heat Mass Transf. **55**(4), 649–654 (2012). https://doi.org/10.1016/j.ijheatmasstransfer.2011.10.045
44. Amler, T.G., Botkin, N.D., Hoffmann, K.-H., Ruf, K.A.: Regularity of solutions of a phase field model. Dyn. Partial Differ. Equ. **10**(4), 353–365 (2013). https://doi.org/10.4310/DPDE.2013.v10.n4.a3
45. Botkin, N.D., Hoffmann, K.-H., Marx, D., Starovoitov, V.N., Turova, V.L.: Modeling in the development of an elasto-optical biosensor based on nanostructures. International Journal of Biomathematics and Biostatistics **2**(2), 191–202 (2013)
46. Botkin, N., Turova, V.: Numerical construction of viable sets for autonomous conflict control systems. Mathematics **2**(2), 68–82 (2014). https://doi.org/10.3390/math2020068
47. Kovtanyuk, A.E., Chebotarev, A.Yu., Botkin, N.D., Hoffmann, K.-H.: Solvability of P1 approximation of a conductive-radiative heat transfer problem. Appl. Math. Comput. **249**, 247–252 (2014). https://doi.org/10.1016/j.amc.2014.10.054
48. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Hoffmann, K.-H.: Theoretical analysis of an optimal control problem of conductive-convective-radiative heat transfer. J. Math. Anal. Appl. **412**(1), 520–528 (2014). https://doi.org/10.1016/j.jmaa.2013.11.003
49. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Hoffmann, K.-H.: The unique solvability of a complex 3D heat transfer problem. J. Math. Anal. Appl. **409**(2), 808–815 (2014). https://doi.org/10.1016/j.jmaa.2013.07.054
50. Lampe, R., Botkin, N., Turova, V., Blumenstein, T., Alves-Pinto, A.: (2014) Mathematical modelling of cerebral blood circulation and cerebral autoregulation: Towards preventing intracranial hemorrhages in preterm newborns. Comput. Math. Methods Med. **2014** art. no. 965275 (2014). https://doi.org/10.1155/2014/965275
51. Botkin, N.D., Turova, V.L.: Examples of computed viability kernels. Trudy Inst. Mat. i Mekh. UrO RAN **21**(2), 306–319 (2015)
52. Frąckowiak, A., Botkin, N.D., Ciałkowski, M., Hoffmann, K.-H.: Iterative algorithm for solving the inverse heat conduction problems with the unknown source function. Inverse Probl. Sci. Eng. **23**(6), 1056–1071 (2015). https://doi.org/10.1080/17415977.2014.986723
53. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Hoffmann, K.-H.: Unique solvability of a steady-state complex heat transfer model. Commun. Nonlinear Sci. Numer. Simul. **20**(3), 776–784 (2015). https://doi.org/10.1016/j.cnsns.2014.06.040

54. Lampe, R., Botkin, N., Turova, V., Blumenstein, T., Alves-Pinto, A.: Mathematical modeling of cerebral oxygenation in premature infants. Eur. J. Paediatr. Neurol. **19**(Suppl. 1), S54–S55 (2015). https://doi.org/10.1016/S1090-3798(15)30179-3
55. Botkin, N.D., Brokate, M., El Behi-Gornostaeva, E.G.: One-phase flow in porous media with hysteresis. Physica B Condens. Matter **486**, 183–186 (2016). https://doi.org/10.1016/j.physb.2015.08.039
56. Chebotarev, A.Yu., Kovtanyuk, A.E., Grenkin, G.V., Botkin, N.D., Hoffmann, K.-H.: Nondegeneracy of optimality conditions in control problems for a radiative-conductive heat transfer model. Appl. Math. Comput. **289**, 371–380 (2016). https://doi.org/10.1016/j.amc.2016.05.036
57. Grenkin, G.V., Chebotarev, A.Y., Kovtanyuk, A.E., Botkin, N.D., Hoffmann, K.-H.: Boundary optimal control problem of complex heat transfer model. J. Math. Anal. Appl. **433** (2), 1243–1260 (2016). https://doi.org/10.1016/j.jmaa.2015.08.049
58. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Hoffmann, K.-H.: Optimal boundary control of a steady-state heat transfer model accounting for radiative effects. J. Math. Anal. Appl. **439**(2), 678–689 (2016). https://doi.org/10.1016/j.jmaa.2016.03.016
59. Botkin, N., Turova, V., Diepolder, J., Bittner, M., Holzapfel, F.: Aircraft control during cruise flight in windshear conditions: Viability approach. Dyn. Games Appl. **7**(4), 594–608 (2017). https://doi.org/10.1007/s13235-017-0215-9
60. Botkin, N.D., Kovtanyuk, A.E., Turova, V.L., Sidorenko, I.N., Lampe, R.: Direct modeling of blood flow through the vascular network of the germinal matrix. Comput. Biol. Med. **92**, 147–155 (2018). https://doi.org/10.1016/j.compbiomed.2017.11.010
61. Botkin, N., Turova, V., Diepolder, J., Holzapfel, F.: Computation of viability kernels on grid computers for aircraft control in windshear. Adv. Sci. Technol. Eng. Syst. J. **3**(1), 502–510 (2018). https://doi.org/10.25046/aj030161
62. Chebotarev, A.Y., Grenkin, G.V., Kovtanyuk, A.E., Botkin, N.D., Hoffmann, K.-H.: Diffusion approximation of the radiative-conductive heat transfer model with Fresnel matching conditions. Commun. Nonlinear Sci. Numer. Simul. **57**, 290–298 (2018). https://doi.org/10.1016/j.cnsns.2017.10.004
63. Chebotarev, A.Y., Grenkin, G.V., Kovtanyuk, A.E., Botkin, N.D., Hoffmann, K.-H.: Inverse problem with finite overdetermination for steady-state equations of radiative heat exchange. J. Math. Anal. Appl. **460**(2), 737–744 (2018). https://doi.org/10.1016/j.jmaa.2017.12.015
64. Sidorenko, I., Turova, V., Botkin, N., Eckardt, L., Alves-Pinto, A., Felderhoff-Müser, U., Rieger-Fackeldey, E., Lampe, R.: Modeling cerebral blood flow dependence on carbon dioxide and mean arterial blood pressure in the immature brain with accounting for the germinal matrix. Front. Neurol. **9**, 812 (2018). https://doi.org/10.3389/fneur.2018.00812
65. Botkin, N.D., Kovtanyuk, A.E, Turova, V.L., Sidorenko, I.N., Lampe, R.: Accounting for tube hematocrit in modeling of blood flow in cerebral capillary networks. Comput. Math. Methods Med. **2019**, Article ID 4235937 (2019). https://doi.org/10.1155/2019/4235937

66. Botkin, N., Martynov, K., Turova, V., Diepolder, J.: Generation of dangerous disturbances for flight systems. Dyn. Games Appl. **9**(3), 628–651 (2019). https://doi.org/10.1007/s13235-018-0259-5
67. Botkin, N.D., Turova, V.L., Kovtanyuk, A.E., Sidorenko, I.N., Lampe, R.: Extended model of impaired cerebral autoregulation in preterm infants: Heuristic feedback control. Math. Biosci. Eng. **16**(4), 2334–2352 (2019). https://doi.org/10.3934/mbe.2019117
68. Chebotarev, A.Y., Kovtanyuk, A.E., Botkin, N.D.: Problem of radiation heat exchange with boundary conditions of the Cauchy type. Commun. Nonlinear Sci. Numer. Simul. **75**, 262–269 (2019). https://doi.org/10.1016/j.cnsns.2019.01.028
69. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Turova, V.L., Sidorenko, I.N., Lampe, R.: Continuum model of oxygen transport in brain. J. Math. Anal. Appl. **474**(2), 1352–1363 (2019). https://doi.org/10.1016/j.jmaa.2019.02.020
70. Lampe, R., Turova, V., Botkin, N., Eckardt, L., Felderhoff-Müser, U., Rieger-Fackeldey, E., Alves-Pinto, A., Kovtanyuk, A., Sidorenko, I.: Postnatal paraclinical parameters associated to occurrence of intracerebral hemorrhage in preterm infants. Neuropediatrics **50**(2), 103–110 (2019). https://doi.org/10.1055/s-0038-1677515
71. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Turova, V.L., Sidorenko, I.N., Lampe, R.: Nonstationary model of oxygen transport in brain tissue. Comput. Math. Methods Med. **2020**, Article ID 4861654 (2020). https://doi.org/10.1155/2020/4861654
72. Lampe, R., Rieger-Fackeldey, E., Sidorenko, I., Turova, V., Botkin, N., Eckardt, L., Alves-Pinto, A., Kovtanyuk, A., Schündeln, M., Felderhoff-Müser, U.: Assessing key clinical parameters before and after intraventricular hemorrhage in very preterm infants. Eur. J. Paediatr. **2019**, 1–9 (2020). https://doi.org/10.1007/s00431-020-03585-9
73. Sidorenko, I., Turova, V., Botkin, N., Kovtanyuk, A., Eckardt, L., Alves-Pinto, A., Felderhoff-Müser, U., Rieger-Fackeldey, E., Lampe, R.: Assessing haemorrhage-critical values of cerebral blood flow by modelling biomechanical stresses on capillaries in the immature brain. Sci. Rep. **10**(1), Article ID 14196 (2020). https://doi.org/10.1038/s41598-020-71087-7
74. Botkin, N., Turova, V., Hosseini, B., Diepolder, J., Holzapfel, F.: Tracking aircraft trajectories in the presence of wind disturbances. Math. Control Relat. Fields (accepted)
75. Kovtanyuk, A.E., Chebotarev, A.Yu, Botkin, N.D., Turova, V.L., Sidorenko, I.N., Lampe, R.: Modeling the pressure distribution in a spatially averaged cerebral capillary network. Math. Control Relat. Fields (accepted)

Papers and Chapters in Peer-Reviewed Collections, Books or Book Series

76. Botkin, N.D.: Numerical construction of sections of the positional absorption set in a linear differential game. In: Subbotin, A.I., Patsko, V.S. (eds.) Algorithms and Programs for Solution of Linear Differential Games (Materials on Computer Software) [in Russian], pp. 5–38. IMM UNTs Akad Nauk SSSR, Sverdlovsk (1984)

77. Botkin, N.D., Zarkh, M.A.: Error estimate for the construction of the positional absorption set in a linear differential game. In: Subbotin, A.I., Patsko, V.S. (eds.) Algorithms and Programs for Solving Linear Differential Games (Materials on Computer Software) [in Russian], pp. 39–80. IMM UNTs Akad Nauk SSSR, Sverdlovsk (1984)
78. Botkin, N.D., Kein, V.M., Patsko, V.S.: Solution to an aircraft landing problem in a minimax statement. In: Malyshev, V.V. et al. (eds.) Collection of Scientific Works: Optimization of Control of Aircraft and Their Systems [in Russian], pp. 8–15. MAI, Moscow (1988)
79. Botkin, N.D., Krasov, A.I.: Positional control in a model problem of aircraft runway acceleration. In: Subbotin, A.I., Tarasjev, A.M. (eds.) Positional Control with a Guaranteed Result (Collection of scientific works) [in Russian], pp. 22–32. IMM UrO Akad. Nauk SSSR, Sverdlovsk (1988)
80. Botkin, N.D, Kein, V.M., Patsko, V.S.: Application of differential game theory methods to an aircraft control problem on landing. In: Subbotin, A.I., Tarasjev, A.M. (eds.) Collection of Scientific Works: Positional Control with a Guaranteed Result [in Russian], pp. 33–44. IMM UrO Akad. Nauk SSSR, Sverdlovsk (1988)
81. Botkin, N.D., Zhukov, S.P., Krasov, A.I.: Combined method of aircraft control on landing. In: Subbotin, A.I., Ushakov, V.N. (eds.) Collection of Scientific Works: Control in Dynamical Systems [in Russian], pp. 18–30. IMM UrO Akad. Nauk SSSR, Sverdlovsk (1990)
82. Botkin, N.D., Zarkh, M.A., Patsko, V.S.: Numerical solution of linear differential games. In: Hämäläinen, R.P., Ehtamo, H.K. (eds.) Lecture Notes in Control and Information Sciences, vol. 156: Differential Games – Developments in Modelling and Computation, pp. 226–234. Springer, Berlin, Heidelberg (1991). https://doi.org/10.1007/BFb0040243
83. Botkin, N.D., Kein, V.M., Patsko, V.S., Turova, V.L., Zarkh, M.A.: Numerical methods for solving differential games, prospective applications to technical problems. In: Bulirsch, R., Kraft, D. (eds.) ISNM International Series of Numerical Mathematics, vol. 115: Computational Optimal Control, pp. 137–145. Birkhäuser, Basel (1994). https://doi.org/10.1007/978-3-0348-8497-6_12
84. Botkin, N.D., Turova-Botkina, V.L.: An algorithm for finding the Chebyshev center of a convex polyhedron. In: Henry, J., Yon, J.P. (eds.) Lecture Notes in Control and Information Sciences, vol. 197: Proceedings of the 16th IFIP-TC7 Conference on System Modelling and Optimization, Compiègne, France, July 5–9, 1993., pp. 833–844. Springer, Berlin, Heidelberg (1994). https://doi.org/10.1007/BFb0035533
85. Hoffmann, K.-H., Botkin, N.D.: Homogenization of a model describing vibration of nonlinear thin plates excited by piezopatches. In: Hoffmann, K.-H., Leugering, G., Trolzsch, F. (eds.) ISNM International Series of Numerical Mathematics, vol. 133: Optimal Control of Partial Differential Equations, pp. 191–200. Birkhäuser, Basel (1999). https://doi.org/10.1007/978-3-0348-8691-8_16
86. Botkin, N.D., Hoffmann, K.-H.: Fully coupled model of a nonlinear thin plate excited by piezoelectric actuators. In: Hoffmann, K.-H., Lasiecka, I., Leugering, G., Sprekels, J., Tröltzsch, F. (eds.) ISNM International Series of Numerical Mathematics, vol. 139: Optimal Control of Complex Structures, pp. 107–118.

Birkhäuser, Basel (2001). https://doi.org/10.1007/978-3-0348-8148-7_9

87. Hoffmann, K.-H., Botkin, N.D.: Real-time optimization and stabilization of distributed parameter systems with piezoelectric elements. In: Grötschel, M., Krumke, S.O., Rambau, J. (eds.) Online Optimization of Large Scale Systems, pp. 205–228. Springer, Berlin, Heidelberg (2001). https://doi.org/10.1007/978-3-662-04331-8_14
88. Botkin, N.D., Hoffmann, K.-H., Turova, V.L.: Freezing of living cells: Mathematical models and design of optimal cooling protocols. In: Leugering, G., Engell, S., Griewank, A., Hinze, M., Rannacher, R., Schulz, V., Ulbrich, M., Ulbrich, S. (eds.) ISNM International Series of Numerical Mathematics, vol. 160: Constrained Optimization and Optimal Control for Partial Differential Equations, pp. 521–540. Birkhäuser, Basel (2012). https://doi.org/10.1007/978-3-0348-0133-1_27
89. Botkin, N., Hoffmann, K.-H., Mayer, N., Turova, V.: Computation of value functions in nonlinear differential games with state constraints. In: Hömberg, D., Tröltzsch, F. (eds.) IFIP Advances in Information and Communication Technology, vol. 391: Proceedings of IFIP Conference on System Modeling and Optimization (CSMO 2011), pp. 235–244. Springer, Berlin, Heidelberg (2013). https://doi.org/10.1007/978-3-642-36062-6_24
90. Botkin, N.D., Hoffmann, K.-H., Turova, V.L.: Mathematical modeling and simulations in cryopreservation of living cells. In: Colvert, A., Coty, H. (eds.) Cryopreservation: Technologies, Applications and Risks/Outcomes, pp. 109–176. Nova Science Publishers Inc. (2013)
91. Botkin, N.D, Turova, V.L.: Dynamic programming approach to aircraft control in a windshear. In: Křivan, V., Zaccour, G. (eds.) Annals of the International Society of Dynamic Games, vol. 13: Advances in Dynamic Games: Theory, Applications, and Numerical Methods, pp. 53–69. Birkhäuser, Cham (2013). https://doi.org/10.1007/978-3-319-02690-9_3
92. Botkin, N., Turova, V.: Simulation of acoustic wave propagation in anisotropic media using dynamic programming technique. In: Pötzsche, C., Heuberger, C., Kaltenbacher, B., Rendl, F. (eds.) IFIP Advances in Information and Communication Technology, vol. 443: Proceedings of IFIP Conference on System Modeling and Optimization (CSMO 2013), pp. 36–51. Springer, Berlin, Heidelberg (2014). https://doi.org/10.1007/978-3-662-45504-3_5
93. Hoffmann, K.-H., Botkin, N.D., Turova, V.L.: Models and optimal control in freezing and thawing of living cells and tissues. In: Leugering, G., Benner, P., Engell, S., Griewank, A., Harbrecht, H., Hinze, M., Rannacher, R., Ulbrich, S. (eds.) ISNM International Series of Numerical Mathematics, vol. 165: Trends in PDE Constrained Optimization, pp. 155–172. Birkhäuser, Cham (2014). https://doi.org/10.1007/978-3-319-05083-6_10
94. Botkin, N., Turova, V.: Aircraft runway acceleration in the presence of severe wind gusts. In: Bociu, L., Désidéri, J.A., Habbal, A. (eds.) Advances in Information and Communication Technology, vol. 494: Proceedings of IFIP Conference on System Modeling and Optimization (CSMO 2015), pp. 147–158. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-55795-3_13
95. Botkin, N., Turova, V.: Optimal abort landing in the presence of severe windshears. In: Bociu, L., Désidéri, J.A., Habbal, A. (eds) Advances in Information

and Communication Technology, vol. 494: Proceedings of IFIP Conference on System Modeling and Optimization (CSMO 2015), pp. 137–146. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-55795-3_12

96. Chebotarev, A.Y., Kovtanyuk, A.E., Botkin, N.D., Hoffmann, K.-H.: Strong optimal controls in a steady-state problem of complex heat transfer. In: Bociu, L., Désidéri, J.A., Habbal, A. (eds.) IFIP Advances in Information and Communication Technology, vol. 494: Proceedings of IFIP Conference on System Modeling and Optimization (CSMO 2015), pp. 209–219. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-55795-3_19
97. Botkin, N., Diepolder, J., Turova, V., Bittner, M., Holzapfel, F.: Viability approach to aircraft control in wind shear conditions. In: Apaloo, J., Viscolani, B. (eds.) Annals of the International Society of Dynamic Games, vol. 15: Advances in Dynamic and Mean Field Games: Theory, Applications, and Numerical Methods, pp. 325–343. Birkhäuser, Cham (2017). https://doi.org/10.1007/978-3-319-70619-1_15
98. Turova, V., Botkin, N., Alves-Pinto, A., Blumenstein, T., Rieger-Fackeldey, E., Lampe, R.: Modeling autoregulation of cerebral blood flow using viability approach. In: Apaloo, J., Viscolani, B. (eds.) Annals of the International Society of Dynamic Games, vol. 15: Advances in Dynamic and Mean Field Games: Theory, Applications, and Numerical Methods, pp. 345–363. Birkhäuser, Cham (2017). https://doi.org/10.1007/978-3-319-70619-1_16
99. Botkin, N.D., Diepolder, J., Turova, V.L.: Viability approach to simulation of an adaptive controller. In: Kalise, D., Kunish, K., Rao, Z. (eds.) Radon Series on Computational and Applied Mathematics, Vol. 21: Hamilton-Jacobi-Bellman Equations: Numerical Methods and Applications in Optimal Control, pp. 43–60. De Gruyter GmbH, Berlin, Munich, Boston (2018). https://doi.org/10.1515/9783110543599-003
100. Botkin, N.D., Golubev, A.E., Turova, V.L.: Aircraft guiding in windshear through differential game-based overload control. In: Jadachowski, L. (ed.) IFAC Proceedings Volume, vol. 52(16): 11th IFAC Symposium on Nonlinear Control Systems NOLCOS 2019, Vienna, Austria, September 4-6, 2019, pp. 706–711. IFAC-PapersOnLine (2019). https://doi.org/10.1016/j.ifacol.2019.12.045
101. Diepolder, J., Botkin, N., Holzapfel, F.: Optimal disturbance generation for flight control law testing. In: Jadachowski, L. (ed.) IFAC Proceedings Volume, vol. 52(16): 11th IFAC Symposium on Nonlinear Control Systems NOLCOS 2019, Vienna, Austria, September 4-6, 2019, pp. 730–734. IFAC-PapersOnLine (2019). https://doi.org/10.1016/j.ifacol.2019.12.049
102. Golubev, A.E., Botkin, N.D., Krishchenko, A.P.: Backstepping control of aircraft take-off in windshear. In: Jadachowski, L. (ed.) IFAC Proceedings Volume, vol. 52(16): 11th IFAC Symposium on Nonlinear Control Systems NOLCOS 2019, Vienna, Austria, September 4-6, 2019, pp. 712–717. IFAC-PapersOnLine (2019). https://doi.org/10.1016/j.ifacol.2019.12.046
103. Martynov, K., Botkin, N.D., Turova, V.L., Diepolder, J.: Quick construction of dangerous disturbances in conflict control problems. In: Ramsey, D.M., Renault, J. (eds.) Annals of the International Society of Dynamic Games, vol. 17: Advances in Dynamic Games: Games of Conflict, Evolutionary Games, Economic Games, and Games Involving Common Interest, pp. 3–24. Birkhäuser, Cham (2020). https://doi.org/10.1007/978-3-030-56534-3

Patents

104. Botkin, N.D., Kein, V.M., Krasov, A.I., Patsko, V. S.: Device for aircraft control during the landing approach. Author certificate N1450250. Declared by Academy of Civil Aviation (Leningrad). Request N4141626; registered 8.09.88 (1988)

105. Botkin, N., Degistrici, Ö., Fassbender, B., Simonsmeier, J., Thie, M.: Zahn-Einfrierer-Behälter. Deutches Patent- und Markenamt. DE 10 2005 047 438 A1, 2007.04.05 (8) (2007)

Papers in Conference Proceedings

106. Botkin, N.D., Patsko, V.S.: Numerical solution of linear differential game. In: Dimovski, I., Stoyanov, J. (eds.) Proceedings of the Third Conference "Differential equations and applications" I. Rousse, Bulgaria, June 30–July 6, 1985 [in Russian], pp. 543–546. 'Angel Kancev' Tech. Univ., Rousse (1987)

107. Botkin, N.D., Patsko, V.S., Turova, V.L., Zarkh, M.A., Kein, V.M.: Aircraft control problems in the presence of windshear. In: Preprint Volume of the Fifth International Symposium on Dynamic Games and Applications. Grimentz, Switzerland, July 15–17, 1992, pp. 133–148. Université de Genève (1992)

108. Botkin, N.: Identification of parameters for thermoelasticity models. In: Kleinschmidt, P., Bachem, A., Derigs, U., Fischer, D., Leopold-Wildburger, U., Mohring, R. (eds.) Operations Research Proceedings 1995, pp. 173–177. Springer, Berlin, Heidelberg (1996). https://doi.org/10.1007/978-3-642-80117-4_30

109. Botkin, N.D.: Identification of unknown parameters for heat conductivity equations. In: Carlomagno, G.M., Brebbia, C.A. (eds.) Proceedings of the VII International Conference on Computational Methods and Experimental Measurements (CMEM95). Capri, Italy, May 16–18, 1995. Computational Mechanics Publications, pp. 101–108 (1995)

110. Botkin, N.D.: Identification of parameters for heat conductivity equations. In: Gottlieb, J., DuChateau, P. (eds.) Parameter Identification and Inverse Problems in Hydrology, Geology and Ecology, vol. 23: Proceedings of a workshop held in Karlsruhe, Germany, April 10–12, 1995, pp. 133–142. Water Science and Technology Library, Kluwer Academic Publishers, Dordrecht (1996). https://doi.org/10.1007/978-94-009-1704-0_7

111. Botkin, N.: Parameters estimation of some electro-elasticity models. In: Bainov, D. (ed.) Proceedings of the Seventh International Colloquium on Differential Equations. Plovdiv, Bulgaria, 18–23 August, 1996, pp. 31–38. VSP, Utrecht, the Netherlands (1997)

112. Botkin, N.D.: Differentiability of solutions of an electro-elasticity model w.r.t. parameters. In: Bainov, D. (ed.) Proceedings of the Eighth International Colloquium on Differential Equations. Plovdiv, Bulgaria, 18–23 August, 1997, pp. 89–96. VSP, Utrecht, the Netherlands (1998)

113. Botkin, N.D., Hoffmann, K.-H.: A fully coupled model of a nonlinear thin plate. In: Hoffmann, K.-H. (ed.) Proceedings of the 1st caesarium. Bonn, November 17–19, 1999. Smart materials, pp. 9–22. Springer, Berlin, Heidelberg (2001). https://doi.org/10.1007/978-3-642-56855-8_2

114. Botkin, N.D., Schlensog, M., Tewes, M., Turova, V.L.: A mathematical model of a biosensor. In: Laudon, M., Romanowicz, B.F. (eds.) Technical Proceedings of the 2001 International Conference on Modeling and Simulation of Microsystems: MSM 2001. Hilton Head Island, SC, USA, March 19–21, 2001. 2001 ACRS Joint Meeting (MSM/ICCN), pp. 231–234. Computational Publications, University of Michigan (2001)
115. Winzek, B., Sterzl, T., Rumpf, H., Botkin, N., Quandt, E.: Thin film shape memory composites. In: NATO Conference on Martensitic Phase Transformation. Metz, France, April 23–26, 2002, pp. 1–15 (2002)
116. Botkin, N.D., Hoffmann, K.-H., Starovoitov, V.N, Turova, V.L.: Modeling the interaction between bristle elastic structures and fluids. In: Technical Proceedings of the 2003 Nanotechnology Conference and Trade Show, vol. 1: Proceedings of the 6th International Conference on Modeling and Simulation of Microsystems (MSM). San Francisco, USA, February 23–27, 2003, pp. 126–129 (2003)
117. Botkin, N.D., Hoffmann, K.-H., Starovoitov, V.N., Turova, V.L.: Treatment of the interface between fine elastic structures and fluids. In: Fradkov, A.L., Churilov, A.N. (eds.) 2003 IEEE International Workshop on Workload Characterization (IEEE Cat. No.03EX775), vol. 4: Proceedings of the International Conference "Physics and Control". St. Petersburg, Russia, August 20–22, 2003, pp. 1367–1372. IEEE, St. Petersburg, Russia (2003). https://doi.org/10.1109/PHYCON.2003.1237107
118. Botkin, N.D., Hoffmann, K.-H., Pykhteev, O.A., Turova, V.L.: Numerical computation of dispersion relations for multi-layered anisotropic structures. In: Technical Proceedings of the 2004 Nanotechnology Conference and Trade Show, vol. 2: Proceedings of the 7th International Conference on Modeling and Simulation of Microsystems (MSM). Boston, Massachusetts, USA, March 9–11, 2004, pp. 411–414 (2004)
119. Botkin, N.D., Hoffmann, K.-H., Pykhteev, O.A., Turova, V.L.: Dispersion relations for acoustic waves in heterogeneous multi-layered structures contacting with fluids. In: Proceedings of the First International Conference on Modeling, Simulation and Applied Optimization (ICMSAO '05). Sharjah, U.A.E., February 1–3, 2005. American University of Sharjah (2005)
120. Hassdorf, R., Feydt, J., Thienhaus, S., Buforn, L., Conté, N., Pykhteev, O., Kružik, M., Botkin, N., Moske, M.: Spherical load indentation in submicron NiTiCu shape memory thin films. In: Bahr, D.F., Cheng, Y.T., Huber, N., Mann, A.B., Wah, K.J. (eds.) MRS Online Proceedings Library Archive, vol. 841: Proceedings of the 2004 Material Research Society Fall Meeting, Symposium R - Fundamentals of Nanoindentation and Nanotribology III. Boston, MA, November 29–December 3, 2004, pp. R9.7.1–R9.7.6. Cambridge University Press (2005). This paper is a Ribbon Award winner. https://doi.org/10.1557/PROC-841-R9.7
121. Melikyan, A., Botkin, N., Turova, V.: Modelling of propagation in anisotropic media using differential game methods. In: Zítek, P. (ed.) IFAC Proceedings Volumes, vol. 38(1): 16th IFAC World Congress. Prague, July 3–8, 2005, pp. 584–589. IFAC-PapersOnline (2005). https://doi.org/10.3182/20050703-6-CZ-1902.00098
122. Melikyan, A.A., Botkin, N.D., Turova, V.L.: Singularity phenomena in ray propagation in anisotropic media. In: Fradkov, A.L., Churilov, A.N. (eds.) Proceedings of the 2005 International Conference on Physics and Control (PhysCon 2005). St. Petersburg, Russia, August 24–26, 2005, pp. 373–378. IEEE (2005).

https://doi.org/10.1109/PHYCON.2005.1514010
123. Botkin, N.D., Pykhteev, O.A., Starovoitova, B.N., Turova, V.L., Hoffmann, K.-H.: Two complementary approaches to modelling a biosensor. In: Hamza, M.H. (ed.) Proceedings of the 15th IASTED International Conference on Applied Simulation and Modelling 2006. Rhodos, Greece, June 26–28, 2006, pp. 525–530. ACTA Press (2006)
124. Hassdorf, R., Feydt, J., Thienhaus, S., Buforn, L., Conté, N., Pykhteev, O., Kružik, M., Botkin, N., Moske, M.: Probing superelasticity in NiTi-based shape memory thin films and foils. In: Mertmann, M. (ed.) SMST-2004: Proceedings of the International Conference on Shape Memory and Superelastic Technologies. Baden-Baden, Germany, October 3–7, 2004, pp. 399–407. ASM International Materials Park, Ohio 44073-0002 (2006)
125. Alkadhi, R.M., Botkin, N.D., Hoffmann, K.-H.: Application of a dynamic programming method to enlarged version of Stoleru's economic model. In: IFAC Proceedings Volumes, vol. 45(25): 15th IFAC Workshop on Control Applications of Optimization. Rimini, Italy, September 13–16, 2012, pp. 14–20. IFAC-PapersOnline (2012). https://doi.org/10.3182/20120913-4-IT-4027.00005
126. Botkin, N.D., Brokate, M., Hoffmann, K.-H., Pykhteev, O.A., Turova, V.L.: Simulation of hysteretic effects in multi-phase flows in aquifers. In: AIP Conference Proceedings, vol. 1479(1), art. no. 1243, pp. 1243–1246 (2012). https://doi.org/10.1063/1.4756378
127. Botkin, N.D., Turova, V.L.: Application of dynamic programming approach to aircraft take-off in a windshear. In: AIP Conference Proceedings, vol. 1479(1), art. no. 1226, pp. 1226–1229 (2012). https://doi.org/10.1063/1.4756373
128. Botkin, N., Turova, V.: Preface of the "Modeling of multiphase flows in porous and fissured media". In: AIP Conference Proceedings, vol. 1479(1), art. no. 1238, pp. 1238 (2012). https://doi.org/10.1063/1.4756376
129. Botkin, N., Turova, V.: Preface of the "Session on Hamilton-Jacobi equations arising from optimal control problems and differential games: Analysis, numerical methods and applications". In: AIP Conference Proceedings, vol. 1479(1), art. no. 1220, pp. 1220–1221 (2012). https://doi.org/10.1063/1.4756371
130. Botkin, N., Turova, V., Lampe, R.: Feedback control of impaired cerebral autoregulation in preterm infants: Mathematical modelling. In: 2017 25th Mediterranean Conference on Control and Automation (MED 2017). Valletta, Malta, July 3–6, 2017, art. no. 7984123, pp. 229–234. IEEE (2017). https://doi.org/10.1109/MED.2017.7984123
131. Chebotarev, A.Y., Kovtanyuk, A.E., Botkin, N.D.: Optimal boundary temperature control in the model of radiative heat transfer. In: AIP Conference Proceedings, vol. 1907(1), art. no. 030044, pp. 1–6 (2017). https://doi.org/10.1063/1.5012666
132. Kovtanyuk, A.E., Chebotarev, A.Y., Grenkin, G.V., Botkin, N.D., Hoffmann, K.-H.: Analysis of thermal processes in a multilayer biotissue exposed to optical radiation. In: Proceedings of the International Conference Days on Diffraction 2017 (DD 2017). St. Petersburg, Russia, June 19–23, 2017, pp. 194–199 (2017). https://doi.org/10.1109/DD.2017.8168022
133. Martynov, K., Botkin, N., Turova, V., Diepolder, J.: Real-time control of aircraft take-off in windshear. Part I: Aircraft model and control schemes. In:

2017 25th Mediterranean Conference on Control and Automation (MED 2017). Valletta, Malta, July 3–6, 2017, art. no. 7984131, pp. 277–284. IEEE (2017). https://doi.org/10.1109/MED.2017.7984131

134. Martynov, K., Botkin, N., Turova, V., Diepolder, J.: Real-time control of aircraft take-off in windshear. Part II: Simulations and model enhancement. In: 2017 25th Mediterranean Conference on Control and Automation (MED 2017). Valletta, Malta, July 3–6, 2017, art. no. 7984132, pp. 285–290. IEEE (2017). https://doi.org/10.1109/MED.2017.7984132
135. Diepolder, J., Piprek, P., Botkin, N., Turova, V., Holzapfel, F.: A robust aircraft control approach in the presence of wind using viability theory. In: 2017 Australian and New Zealand Control Conference (ANZCC 2017). Gold Coast, QLD, Australia, December 17–20, 2017, pp. 155–160. IEEE (2018). https://doi.org/10.1109/ANZCC.2017.8298503
136. Kovtanyuk, A.E., Chebotarev, A.Yu., Dekalchuk, A.A., Botkin, N.D., Lampe, R.: Analysis of a mathematical model of oxygen transport in brain. In: Proceedings of the International Conference Days on Diffraction (DD 2018). St. Petersburg, June 4–8, 2018, pp. 187–191. IEEE (2018). https://doi.org/10.1109/DD.2018.8553338
137. Kovtanyuk, A.E., Chebotarev, A.Yu., Dekalchuk, A.A., Botkin, N.D., Lampe, R.: An iterative algorithm for solving an initial boundary value problem of oxygen transport in brain. In: Proceedings of the International Conference Days on Diffraction 2019 (DD 2019). St. Petersburg, June 3–7, 2019, pp. 99–104. IEEE (2019). https://doi.org/10.1109/DD46733.2019.9016443
138. Hosseini, S., Botkin, N., Diepolder, J., Holzapfel, F.: Robust optimal input design for flight vehicle system identification. In: AIAA Scitech 2020 Forum, Orlando, FL, January 6–10, 2020, p. 0290 (2020). https://doi.org/10.2514/6.2020-0290

Preprints and Scientific Reports

139. Botkin, N.D.: Approximation error in a differential game. Dep. v VINITI 11.04.83, No. 1910-83 DEP, pp. 1–31 (1983) [in Russian]
140. Botkin, N.D., Kein, V.M., Krasov, A.I., Patsko, V.S.: Research on the improvement of on-board and ground-based aircraft control systems. Control of the aircraft lateral motion on landing under wind disturbance conditions. Report 81104592/02830078880 (All-Union Scientific and Technical Information Center - VNTIZ), L. - Sverdlovsk, pp. 1–78 (1983) [in Russian]
141. Botkin, N.D.: Error estimation of numerical constructions in a quasi-linear differential game. Dep. v VINITI 26.05.86, No. 3779-B, pp. 1–27 (1986) [in Russian]
142. Botkin, N.D., Patsko, V.S.: Development of numerical methods for constructing extreme wind disturbances acting on an aircraft at the landing stage. Analysis of the application of the differential game theory methods for simulating wind disturbances. Report 01880003467/02880044271 (All-Union Scientific and Technical Information Center – VNTIZ), Sverdlovsk, pp. 1–46 (1987) [in Russian]
143. Botkin, N.D., Patsko, V.S., Turova, V.L.: Development of numerical methods for constructing extreme wind disturbances acting on an aircraft at the landing stage. Development of algorithms for constructing extreme wind disturbances. Report 01880003467/02880054701 (All-Union Scientific and Technical Information Center – VNTIZ), Sverdlovsk, pp. 1–58 (1987) [in Russian]

144. Botkin, N.D., Turova, V. L.: Development of numerical methods for constructing extreme wind disturbances acting on an aircraft at the landing stage. Development of a package of applied programs for the synthesis of extreme wind disturbances at the landing stage. Report 01880003467/02880069889 (All-Union Scientific and Technical Information Center – VNTIZ), Sverdlovsk, pp. 1–39 (1988) [in Russian]

145. Botkin, N.D., Turova, V.L., Ivanov, A.G.: Development of numerical methods for constructing extreme wind disturbances acting on an aircraft at the landing stage. Recommendations for simulating extreme wind disturbances. Report 01880003467/02880045178 (All-Union Scientific and Technical Information Center – VNTIZ), Sverdlovsk, pp. 1–51 (1988) [in Russian]

146. Botkin, N. D., Patsko, V. S., Zarkh, M. A.: Numerical solution of linear differential games. IV Intern. Symposium on Differential Games and Applications. Helsinki, August 9–10, 1990. Preprint (1990)

147. Botkin, N.D.: Approximation schemes for finding the value function for differential games with nonterminal payoff functional. In: Schwerpunktprogramm der Deutschen Forschungsgemeinschaft – Anwendungsbezogene Optimierung und Steuerung. Report No. 439, pp. 1–15. Institut für Angewandte Mathematik und Statistik der Universität Würzburg, Germany (1993)

148. Botkin, N.D.: Construction of viable sets for autonomous controlled systems. In: Schwerpunktprogramm der Deutschen Forschungsgemeinschaft – Anwendungsbezogene Optimierung und Steuerung. Report No. 430, pp. 1–14. Institut für Angewandte Mathematik und Statistik der Universität Würzburg, Germany (1993)

149. Botkin, N.D.: Randomized algorithms for the separation of point sets and for solving quadratic programs. In: Schwerpunktprogramm der Deutschen Forschungsgemeinschaft – Anwendungsbezogene Optimierung und Steuerung. Report No. 457, pp. 1–13. Institut für Angewandte Mathematik und Statistik der Universität Würzburg, Germany (1993)

150. Botkin, N.D., Rjazantzeva, E.A.: Some examples of analytically constructed viability kernels. In: Schwerpunktprogramm der Deutschen Forschungsgemeinschaft – Anwendungsbezogene Optimierung und Steuerung. Report No. 515, pp. 1-16. Mathematisches Institut der Technischen Universität München, Germany (1994)

151. Botkin, N.D., Stoer, J.: An algorithm for finding the minimum of a convex function on the convex hull of a point set. In: Schwerpunktprogramm der Deutschen Forschungsgemeinschaft – Anwendungsbezogene Optimierung und Steuerung. Report No. 440, pp. 1–12. Institut für Angewandte Mathematik und Statistik der Universität Würzburg, Germany (1993)

152. Botkin, N.D., Turova-Botkina, V.L.: An algorithm for finding the Chebyshev center of a convex polyhedron. In: Schwerpunktprogramm der Deutschen Forschungsgemeinschaft – Anwendungsbezogene Optimierung und Steuerung. Report No. 395, pp. 1–11. Institut für Angewandte Mathematik und Statistik der Universität Würzburg, Germany (1993)

153. Botkin, N.D.: Estimation of parameters of thin plates excited by piezoelectric patches. Report TUM M9704, pp. 1–39. Technische Universität München, Fakultät für Mathematik, München, Germany (1997)

154. Botkin, N.D.: Estimation of parameters of a linear thin plate excited by a piezoelectric patch. Preprint 97-19, pp. 1–12. DFG project “Echtzeit-Optimierung

großer Systeme" (1997)

155. Botkin, N.D.: Parameters estimation of some electro-elasticity models. Preprint 97-18, pp. 1–8. DFG-Project "Echtzeit-Optimierung großer Systeme" (1997)
156. Hoffmann, K.-H., Botkin, N.D.: Oscillations of nonlinear thin plates excited by piezoelectric patches. Preprint 97-17, pp. 1–13. DFG-Project "Echtzeit-Optimierung großer Systeme" (1997)
157. Botkin, N.D.: Homogenization of an equation describing linear thin plates excited by piezopatches. Preprint 98-1, pp. 1–12. DFG project "Echtzeit-Optimierung großer Systeme" (1998)
158. Hoffmann, K.-H., Botkin, N.D.: Homogenization of equations describing vibration of nonlinear thin plates excited by piezopatches. Preprint 98-18, pp. 1–20. DFG project "Echtzeit-Optimierung großer Systeme" (1998)
159. Botkin, N.D., Litvinov, W.G., Rubezhansky, Y.I.: Models and problems for piezoelectric elastic bodies and thin shells. Preprint 99-5, pp. 1–17. DFG-Project "Echtzeit-Optimierung großer Systeme" (1999)
160. Botkin, N.D., Hoffmann, K.-H.: A fully coupled model of a nonlinear thin plate excited by piezoelectric actuators. Preprint 00-25, pp. 1–13. DFG-Project "Echtzeit-Optimierung großer Systeme" (2000)
161. Botkin, N.D., Hoffmann, K.-H.: Homogenization of a fully coupled model for a nonlinear thin plate excited by piezoelectric transducers. Preprint 00-23, pp. 1–11. DFG-Project "Echtzeit-Optimierung großer Systeme" (2000)
162. Hoffmann, K.-H., Botkin, N.D., Schlensog, M., Tewes, M., Turova, V.L.: Wave propagation in biosensors. caesar Annual Report 2000, pp. 1–2. Nanotechnology/Materials Science 2-1-3 (2001)
163. Hoffmann, K.-H., Botkin, N.D., Winzek, B.: Numerical modeling of shape memory composites. caesar Annual Report 2000, pp. 1–2. Nanotechnology/Materials Science 2-1-2 (2001)
164. Botkin, N.D., Hoffmann, K.-H., Starovoitov, V.N.: Homogenization of interfaces between rapidly oscillating fine elastic structures and fluids. Preprint 2002-12-30 30. caesar, Bonn (2002)
165. Botkin, N.D., Turova, V.L.: Mathematical models of a biosensor. Preprint 2002-12-30 31, pp. 1–18. caesar, Bonn (2002)
166. Hoffmann, K.-H., Botkin, N.D., Turova, V.L.: Biosensor: Modeling and simulation. caesar Annual Report 2001, pp. 1–2. Coupling of Biological and Electronic Systems 2-2-2 (2002)
167. Botkin, N.D., Hoffmann, K.-H., Meirmanov, A.M., Starovoitov, V.N.: Diffusion problem with boundary conditions of hysteresis type. Preprint N111, pp. 1–15. SFB611 "Singuläre Phänomene und Skalierung in mathematischen Modellen", Bonn (2003)
168. Botkin, N., Khludnev, A.: Shape optimization for elastic structures with nonlinear cracks. Preprint N121, pp. 1–15. SFB611 "Singuläre Phänomene und Skalierung in mathematischen Modellen", Bonn (2003)
169. Botkin, N.D., Turova, V.L.: Finite element modelling of a biosensor. Preprint N110, pp. 1–19. SFB611 "Singuläre Phänomene und Skalierung in mathematischen Modellen", Bonn (2003)

170. Hoffmann, K.-H., Botkin, N.D., Hölscher, H.: Tire sensor: Analysis and simulation. caesar Annual Report 2002, pp. 1–2. Nanotechnology/Materials Science 2-1-2 (2003)
171. Hoffmann, K.-H., Botkin, N.D., Starovoitov, V.N., Turova, V.L.: Mathematical modeling and simulation of the biosensor. caesar Annual Report 2002, pp. 1–2. Coupling of Biological and Electronic Systems 2-2-2 (2003)
172. Hoffmann, K.-H., Botkin, N.D., Starovoitov, V.N., Turova, V.L.: Treatment of the interface between fine elastic structures and fluids with homogenization method. Preprint N100, pp. 1–24. SFB611 "Singuläre Phänomene und Skalierung in mathematischen Modellen", Bonn (2003)
173. Hoffmann, K.-H., Botkin, N.D., Turova, V.L.: Biosensor: Development of numerical methods and software. caesar Annual Report 2002, pp. 1–2. Coupling of Biological and Electronic Systems 2-2-3 (2003)
174. Botkin, N.D., Hoffmann, K.-H., Otto, F., Starovoitov, V.N, Turova, V.L.: Nonlinear interaction of piezoelectrically excited surface waves. Singular Phenomena and Scaling in Mathematical Models. Arbeits- und Ergebnisbericht 2002–2004, pp. 279–303. Reinsche Fridrich-Wilhelms-Universität, Sonderforschungsbereich 611, Bonn (2004)
175. Botkin, N.D., Melikyan, A.A., Turova, V.L.: Propagation of disturbances in inhomogeneous anisotropic media. Preprint N181, pp. 1–25. SFB611 "Singuläre Phänomene und Skalierung in mathematischen Modellen", Bonn (2004)
176. Hoffmann, K.H, Botkin, N.D., Pykhteev, O.A., Kružik, M.: Orthodontic film composites: Superelastic composite modeling. caesar Annual Report 2003, pp. 1–2. Nanotechnology/Materials Science 2-1-1, Bonn (2004)
177. Hoffmann, K.-H., Botkin, N.D., Pykhteev, O.A., Turova, V.L.: MAMS: Mathematical modeling of a biosensor. caesar Annual Report 2003, pp. 1–2. Coupling of Biological and Electronic Systems 2-2-2, Bonn (2004)
178. Hoffmann, K.-H., Starovoitov, V.N., Botkin, N.D.: Modeling: Problems of liquid-solid interaction and their application in biosensorics. caesar Annual Report 2003, pp. 1–2. Coupling of Biological and Electronic Systems 2-2-1, Bonn (2004)
179. Hölscher, H., Botkin, N., Tewes, M., Lohndorf, M., Hoffmann, K.-H., Quandt, E.: Modelling of pneumatic tires by a finite element model for the developement of a tire friction remote sensor. Preprint 2004-10-28 40, pp. 1–17. caesar, Bonn (2004)
180. Hoffmann, K.-H., Botkin, N.D., Pykhteev, O.A.: Orthodontic film composites: Superelastic composite material. caesar Annual Report 2004, pp. 1–2. Nanotechnology/Materials Science 2-1-1, Bonn (2005)
181. Hoffmann, K.-H., Botkin, N.D., Pykhteev, O.A., Turova. V.L.: MAMS: Mathematical modeling of a biosensor. caesar Annual Report 2004, pp. 1–2. Coupling of Biological and Electronic Systems 2-2-1, Bonn (2005)
182. Hoffmann, K.-H., Starovoitov, V.N., Botkin, N.D.: Problems of particles sedimentation and their application in biosensorics. caesar Annual Report 2004, pp. 1–2. Coupling of Biological and Electronic Systems 2-2-8, Bonn (2005)
183. Voigt, A., Hoffmann, K.-H., Backofen, R., Botkin, N., Goepfert, A., Pykhteev, O., Turova, V., Vey, S., Zollorsch, A.: Viola. caesar Annual Report 2004, pp. 1–2. Nanotechnology/Materials Science 2-1-30, Bonn (2005)

184. Hoffmann, K.-H., Botkin, N.D., Pykhteev, O.A.: Finite element modelling of a microfluidic reactor. caesar Annual Report 2005, pp. 1–2. Nanotechnology/Materials Science 2-1-28, Bonn (2006)

185. Hoffmann, K.-H., Botkin, N.D., Pykhteev, O.A.: Optimization of cooling protocols in cryopreservation of living tissues. caesar Annual Report 2005, pp. 1–2. Biotechnology 2-2-5, Bonn (2006)

186. Hoffmann, K.-H., Botkin, N.D., Pykhteev, O.A.: Orthodontic film composites-superelastic composite material. caesar Annual Report 2005, pp. 1–2. Nanotechnology/Materials Science 2-1-12, Bonn (2006)

187. Hoffmann, D., Moske, M., Hoffmann, K.-H., Giersig, M., Pascal, R., Botkin, N., Starovoitov, V., Hilgendorff, M., Treitz, G., Zabe-Kuhn, M., Fassbender, B.: ELOBIS–Elasto-optical biosensor based on nanostructures. caesar Annual Report 2005, pp. 1–2. Biotechnology 2-2-1, Boon (2006)

188. Voigt, A., Backofen, R., Botkin, N., Goepfert, A., Pykhteev, O., Starovoitova, B., Turova, V., Vey, S., Zollorsch, A.: VIOLA-TechSim. caesar Annual Report 2005, pp. 1–2. Nanotechnogy/Materials Science 2-1-35, Bonn (2006)

189. Hoffmann, K.-H., Botkin, N.D., Egler, C., Fassbender, B., Hidendorff, M., Giersig, M., Knekties, J., Pascal, R., Patoka, P., Schuldenzucker, U., Troszczynska, S., Turova, V., Weckmann, A., Zabe-Kuhn, M.: Nanosafe2. caesar Annual Report 2007, pp. 64–65. Molecular Biomedicine and Medical Technology, Bonn (2007)

190. Botkin, N.D., Hoffmann, K.-H.: Optimal control in cryopreservation of cells and tissues. Preprint SPP1253-10-07, pp. 1–34. DFG Priority programm 1253 "Optimization with Partial Differential Equations" (2008)

191. Botkin, N.D., Hoffmann, K.-H., Frąckowiak, A., Ciałkowski, A.M.: L^2 and $H^{1/2}$ fitting algorithms for solving inverse problems of heat transfer. Preprint SPP1253-10-06, pp. 1–10. DFG Priority programm 1253 "Optimization with Partial Differential Equations" (2008)

192. Botkin, N.D., Hoffmann, K.-H., Frąckowiak, A., Ciałkowski, A.M.: Study of the heat transfer between gases and solid surfaces covered with micro rods. Preprint SPP1253-10-05, pp. 1–13. DFG Priority programm 1253 "Optimization with Partial Differential Equations" (2008)

193. Botkin, N.D., Hoffmann, K.-H., Mayer, N., Turova, V.L.: Approximation schemes for solving disturbed control problems with nonterminal time and phase constraints. Preprint SPP 1253-105, pp. 1–21. DFG Priority programm 1253 "Optimization with Partial Differential Equations" (2009)

194. Botkin, N.D., Hoffmann, K.-H., Turova, V.L.: Stable solutions of Hamilton-Jacobi equations. Application to control of freezing processes. Preprint SPP1253-080, pp. 1–25. DFG Priority programm 1253 "Optimization with Partial Differential Equations" (2009)

195. Hoffmann, K.-H., Botkin, N.D., Amler, T.G., Witterstein, G., Mayer, N.: Modeling of CO2 sequestration including parameter identification and numerical simulations. Annual Report, KAUST-TUM Special Partnership, pp. 99–114. Munich Centre of Advanced Computing, München (2010)

196. Kovtanyuk, A.E., Botkin, N.D., Hoffmann, K.-H.: Numerical simulations of a coupled conductive-radiative heat transfer model using parallel computing.

Preprint SPP 1253-112, pp. 1–13. DFG Priority programm 1253 "Optimization with Partial Differential Equations" (2010)

197. Hoffmann, K.-H., Botkin, N.D, Amler, T.G., Witterstein, G., Mayer, N.: Modeling of CO2 sequestration including parameter identification and numerical simulations. Annual Report, KAUST-TUM Special Partnership, pp. 127–148. Munich Centre of Advanced Computing, München (2011)
198. Amler, T.G., Botkin, N.D., Hoffmann, K.-H., Hoteit, I.: Continuity in time of solutions of a phase-field model. arXiv Preprint arXiv:1308.0157, pp. 1–17. Cornell University (2013)

Conference Abstracts

199. Botkin, N.D., Patsko, V.S.: Universal optimal strategy in a differential game with fixed terminal time. In: IV-th All-Union Conference on Optimal Control in Mechanical Systems. Moscow, November 16–18, 1982. IPM AN SSSR, Moscow, pp. 35–36 (1982) [in Russian]
200. Botkin, N.D., Patsko, V.S.: Universal strategy in a linear differential game. In: IX-th All-Union Conference on Control Problems. Erevan, November 14–18, 1983. Nauka, Moscow, pp. 406–407 (1983) [in Russian]
201. Botkin, N.D., Patsko, V.S.: Numerical solution of linear differential games. In: Third Conference on Differential Equations and Applications. Ruse, Bulgaria, June 30–July 6, 1985. Center of Mathematics of the "Angel Kanchev" Higher Technical School, Ruse, p. 22 (1985)
202. Botkin, N.D., Zarkh, M.A., Patsko, V.S.: Application of differential game theory for solving of aircraft guaranteed control problems. In: All-Union Scientific-Practice Conference: Safety and Efficiency of Exploiting of the Air Transport. Reliability of the Aviation Technique. Leningrad - OLAGA, October 9–11, 1985. Nauka, Moscow, p. 49 (1985) [in Russian]
203. Botkin, N.D., Zarkh, M.A., Patsko, V.S.: Numerical solving of low-dimensional linear differential games with fixed terminal time. In: V-th All-Union Conference on Control in Mechanical Systems. Kazan, June 12–14, 1985. Kazan Aviation Institute, p. 34 (1985) [in Russian]
204. Botkin, N.D., Patsko, V.S., Taras'ev, A.M., Ushakov, V.N.: Approximate solving of differential games. In: All-Union School-Seminar: Mathematical Modelling in Science and Technology. Perm, June 9–15, 1986, p. 48 (1986) [in Russian]
205. Botkin, N.D., Kein, V.M., Patsko, V.S.: Nonlinear synthesis in the problem of aircraft control on landing. In: Abstracts of the All-Union Seminar "Dynamics of nonlinear control processes". Tallinn, September 1987. Moscow, p. 135 (1987) [in Russian]
206. Botkin, N.D., Krasov, A.I.: Optimal control of aircraft motion during runaway acceleration under wind disturbances. In: XVI-th Gagarin Scientific Readings on Astronautics and Aviation. Moscow, 1986. Nauka, Moscow, p. 93 (1987) [in Russian]
207. Botkin, N.D.: Analytical construction of the value function in a pursuit-evasion differential game with combined restrictions on the players' controls. In: Conference of Young Mathematicians. Sverdlovsk, 1988. Scientific Reports, AN SSSR, UrO, Sverdlovsk, p. 11 (1988) [in Russian]

208. Botkin, N.D., Patsko, V.S., Turova, V.L.: Simulation of the aircraft landing process under windshear conditions. In: V-th All-Union Conference on Flight Safety. Flight Safety and Preventing Aviation Accidents. Leningrad, November 1–3, 1988, p. 8 (1988) [in Russian]

209. Botkin, N.D., Zarkh, M.A.: Package of programs for solving linear differential games of the second and third order. In: VI-th All-Union Conference on Optimal Control in Mechanical Systems. Lvov, April 26–28, 1988, p. 175 (1988) [in Russian]

210. Botkin, N.D., Zhukov, S.P., Krasov, A.I.: Combined method of aircraft control on landing. In: XVII-th Gagagin Scientific Readings on Austonautics and Aviation. Moscow, 1988. Nauka, Moscow, p. 211 (1989) [in Russian]

211. Botkin, N.D., Zarkh, M.A.: Development and employment of a package of applied programs for solving guaranteed control problems with the use of instrumental system SATURN. In: Software for New Generation of Computers: 8th Sibirian School on Packages of Applied Programs. Irkutsk, 1989. ICC SB RAS, Irkutsk, p. 94 (1989) [in Russian]

212. Botkin, N.D., Patsko, V.S., Zarkh, M.A.: Numerical solving of linear differential games. In: III-rd All-Union School-Seminar “Flight Dynamics and Operational Research”. Klin, 1990. MAI, Moscow, pp. 103–104 (1990) [in Russian]

213. Botkin, N.D., Zarkh, M.A., Ivanov, A.G., Ryazantzeva, E.A.: Construction of a solvability set for linear differential games. In: Abstracts of the VII-th All-Union Conference “Control in Mechanical Systems”. Sverdlovsk, June 1990. Sverdlovsk, p. 15 (1990) [in Russian]

214. Botkin, N.D., Patsko, V.S., Zarkh, M.A., Turova, V.L.: Methods for solving non-smooth problems of conflict control. In: Abstracts of the International Seminar “Non-smooth and Discontinuous Control and Optimization Problems”. Vladivostok, 1991. Minsk, pp. 29-31 (1991) [in Russian]

215. Botkin, N.D., Zarkh, M.A., Kein, V.M., Patsko, V.S., Turova, V.L.: Synthesis of guaranteeing aircraft control on take-off and landing. In: VIIth All-Union Congress on Theoretical and Applied Mechanics. Moscow, August 15–21, 1991. Moscow, p. 60 (1991) [in Russian]

216. Botkin, N.D., Zarkh, M.A., Patsko, V.S.: Optimal feedback control and switch surfaces in linear differential games. In: International Conference on Game Theory. Florence, Italy, June 25–27, 1991. Firenze (1991)

217. Botkin, N.D., Kein, V.M., Patsko, V.S., Turova, V.L., Zarkh, M.A.: Differential games and aircraft control problems in the presence of wind disturbances. In: IUTAM Symposium on Optimal Control of Mechanical Systems. Moscow, April 19–25, 1992. Moscow, pp. 9-10 (1992)

218. Botkin, N.D., Patsko, V.S., Turova, V.L., Zarkh, M.A.: Numerical methods for solving differential games. Prospective applications to technical problems. In: 9th IFAC Workshop “Control Applications of Optimization”. München, FRG, September 2–4, 1992, pp. 1–2 (1992)

219. Botkin, N.D., Zarkh, M.A., Patsko, V.S., Turova, V.L.: Numerical construction of stability sets in linear differential games. In: International Seminar “Stability and Oscillations of Nonlinear Control Systems”. Moscow, June 18–19, 1991, p. 84 (1992) [in Russian]

220. Botkin, N.D., Turova-Botkina, V.L.: An algorithm for finding the Chebyshev center of a convex polyhedron. In: 16th IFIP Conference on System Modelling

and Optimization. Compiegne, France, July 5–9, 1993. INRIA, vol. 2, pp. 635–637 (1993)

221. Botkin, N.D.: A randomized algorithm for solving quadratic programs. In: J. Dolezal, J. Fidler (eds.) 17th IFIP TC7 Conference on System Modelling and Optimization. Prague, Czech Republic, July 10–14, 1995. Institute of Information Theory and Automation, Academy of Sciences of the Czech Republic, vol. 1, pp. 317–320 (1995)
222. Botkin, N.: Identification of parameters for thermoelasticity models. In: Abstracts of Symposium über Operations Research (SOR'95). Passau, Germany, September 13–15, 1995. Universität Passau, p. 111 (1995)
223. Botkin, N.: Parameters estimation of some electroelasticity models. In: Abstracts of Symposium über Operations Research (SOR 96). Braunschweig, Germany, September 4–6, 1996. Technische Universität Braunschweig, p. 114 (1996)
224. Botkin, N.D.: Differentiability of solutions of an electro-elasticity model w.r.t. parameters. In: Abstracts of Invited Lectures and Short Communications delivered at the Eighth International Colloquium on Differential Equations. Plovdiv, Bulgaria, August 18–23, 1997, p. 38 (1997)
225. Botkin, N., Hoffmann, K.-H.: Mathematical models of structures controlled by piezoelectric actuator. Design of real-time controls. In: SIAM Annual Meeting. San Diego, California, July 9–13, 2001, p. 245 (2001)
226. Arndt, M., Botkin, N., Bourauel, C., Drescher, D., Hassdorf, R., Kružik, M., Moske, M., Pykhteev, O., Quandt, E., Rumpf, H., Sernetz, F., Sterzl, T.: Analysis of force systems of superelastic nickel titanium alloy leveling arches and development of superelastic compound wires for use in orthodontics. In: Proceedings of the 6th International Symposium on Computer Methods in Biomechanics & Biomechanical Engineering. Madrid, Spain, February 25–28, 2004 (2004)
227. Melikyan, A.A., Botkin, N.D., Turova, V.L.: Singularity phenomena in ray propagation in anisotropic media. In: Second International Conference on Physics and Control (PhysCon 2005). St. Petersburg, Russia, August 24–26, 2005, pp. 83–84 (2005)
228. Botkin, N.D., Hoffmann, K.-H., Turova, V.L.: Optimal control in cryopreservation of living tissues. In: International Conference "Differential Equations and Topology" dedicated to the Centennial Anniversary of Lev Semenovich Pontryagin. Moscow, June 17–22, 2008, pp. 254–255 (2008)
229. Hoffmann, K.-H., Amler, T.G., Botkin, N.D., Turova, V.L.: Propagation and deposition of air driven nanoparticles in complex channeled structures. Abstract of poster presentation. In: Conference "Mathematics in Biosciences", Helmholtz Zentrum München, p. 32 (2008)
230. Hoffmann, K.-H., Botkin, N.D., Pykhteev, O.A.: Optimal control in cryopreservation of cells and tissues. Abstract of poster presentation. In: Conference "Mathematics in Biosciences", Helmholtz Zentrum München, p. 26 (2008)
231. Botkin, N.D., Hoffmann, K.-H.: Control design in cryopreservation of living cells. In: International Conference "Actual Problems of Stability and Control Theory". Ekaterinburg, Russia, September 21–26, 2009, pp. 158–159 (2009)
232. Botkin, N.D., Turova, V.L.: Simulation of cell shrinkage caused by osmotic cellular dehydration during freezing. In: 4th International Conference on High

Performance Scientific Computing. Hanoi, Vietnam, March 2–6, 2009, p. 40 (2009)

233. Hoffmann, K.-H., Botkin, N.D.: Modeling and optimization in cryopreservation using phase field models. In: 4th International Conference on High Performance Scientific Computing. Hanoi, Vietnam, March 2–6, 2009, p. 88 (2009)
234. Botkin, N., Turova, V., Hoffmann, K.-H., Mayer, N.: Computation of value functions in nonlinear differential games. In: 25th IFIP TC7 Conference on System Modeling and Optimization. Berlin, Germany, September 12–16, 2011, p. 236 (2011)
235. Kovtanyuk, A.E., Botkin, N.D., Hoffmann, K.-H.: Numerical simulations of a coupled conductive-radiative heat transfer model. In: 5th International Conference on High Performance Scientific Computing. Hanoi, Vietnam, March 5–9, 2012, p. 119 (2012)
236. Botkin, N.D., Turova, V.L.: Application of Krasovskii's unification method to simulation of acoustic waves in anisotropic media. In: International Conference "System Dynamics and Control Processes" dedicated to the 90th Anniversary of Academician N. N. Krasovskii. Ekaterinburg, Russia, September 15–20, 2014, pp. 228–229 (2014)
237. Botkin, N.D.: Mathematical modeling of physical processes in biology. In: Book of abstracts of the 7th International Conference on Mathematical Modeling. Yakutsk, Russia, June 30–July 4, 2014, pp. 4–5 (2014)
238. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Hoffmann, K.-H.: Optimal control in a model of complex heat transfer. In: Dynamics and Structure of Combustion Waves: 2nd International Conference. Vladivostok, Russia, July 23–27, 2014, p. 20 (2014)
239. Kovtanyuk, A.E., Chebotarev, A.Y., Botkin, N.D., Hoffmann, K.-H.: Unique solvability of a P1 steady-state heat transfer model in three dimensions. In: Dynamics and Structure of Combustion Waves: 2nd International Conference. Vladivostok, Russia, July 23-27, 2014, p. 12 (2014)
240. Turova, V.L., Lampe, R., Botkin, N.D., Blumenstein, T., Alves-Pinto, A.: Autoregulation of cerebral blood flow: Towards preventing intracranial hemorrhages in premature newborns. In: Book of abstracts of the 7th International Conference on Mathematical Modeling. Yakutsk, Russia, June 30–July 4, 2014, pp. 87–88 (2014)
241. Lampe, R., Botkin, N., Turova, V., Blumenstein, T., Alves-Pinto, A.: Cerebral blood circulation in premature infants by means of mathematical modeling. In: Abstracts of the 41st Annual Meeting of the Society of Neuropediatrics. Basel, April 23–26, 2015. Neuropediatrics **46**(S 01), FV01-03 (2015). https://doi.org/10.1055/s-0035-1550640
242. Botkin, N.D., Turova, V.L.: Dynamic games in biomedical problems. In: 11th ISDG Workshop. Warsaw, Poland, July 13–15, 2017, p. 1 (2017)
243. Kovtanyuk, A.E., Chebotarev, A.Yu., Botkin, N.D., Turova, V.L., Sidorenko, I.N., Lampe, R.: An inverse problem of oxygen transport in brain. In: The 32nd International Conference of the Jangjeon Mathematical Society (ICJMS2019). Vladivostok, Russia, July 17–21, 2019, pp. 47–50 (2019)

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