

# **Pavlo O. Kasyanov**

Educational and Scientific Complex “Institute for Applied System Analysis” at the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute” of the Ministry of Education and Sciences of Ukraine and the National Academy of Sciences of Ukraine

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## **I. PROFESSIONAL PREPARATION**

Dr.Hab. in Theoretical Bases of Computer Sciences and Cybernetics, 2010  
V. M. Glushkov Institute of Cybernetics of the  
National Academy of Sciences of Ukraine, Kyiv, Ukraine

Ph.D. in Differential Equations, 2007  
Department of Mechanics and Mathematics  
National Taras Shevchenko University of Kyiv, Kyiv, Ukraine

MS in Statistics, 2005  
Department of Mechanics and Mathematics  
National Taras Shevchenko University of Kyiv, Kyiv, Ukraine

BS in Mathematics, 2003  
Department of Mechanics and Mathematics  
National Taras Shevchenko University of Kyiv, Kyiv, Ukraine

## **II. APPOINTMENTS**

### **Academic Positions**

Director, 2015 - present  
Head of the Research Department, 2010–2015  
Doctoral Student, 2008–2010 (Research Advisor, Acad., Prof. Michael Zgurovsky)  
Professor, 2010 – present (part time)  
Associated Professor 2008–2010 (part time)  
Assistant Professor 2007–2008 (part time)  
Senior Researcher 2007–2008 (part time)  
Educational and Scientific Complex “Institute for Applied System Analysis” at the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute” of the Ministry of Education and Sciences of Ukraine and the National Academy of Sciences of Ukraine

Visiting Scholar, Feb, Jul-Aug 2012, Feb-Mar, Jun-Jul 2013,  
Feb-Mar, Jun-Jul, Nov-Dec 2014,  
Jun-Jul 2015, Sep-Oct 2016, Jan 2018 (leaves from IASA)  
Volunteer and Adjunct Professor, 2012 - present  
Department of Applied Mathematics & Statistics  
Stony Brook University

Associated Professor, 2008–2010 (part time)  
Assistant Professor, 2006–2008  
Department of Mechanics and Mathematics  
National Taras Shevchenko University of Kyiv, Kyiv, Ukraine

## Professional Positions

Senior Data Scientist, 2020 - present (contractor)  
Geo Management and Logistics Inc., NY, USA

## Awards and Honors

- 2024 Corresponding Member of the National Academy of Sciences of Ukraine
- 2022 Fellow of the Universities for Ukraine (U4U) Non-Residential Fellowship Program
- 2022 EIT Manufacturing Financial support, EuroSpaceHub - increasing the transfer of space innovations and technologies by bringing together the scientific community, industry and startups in the space industry <https://eit-hei.eu/projects/eurospacehub/>
- 2020 Nominal scholarships of the Verkhovna Rada of Ukraine for young scientists – doctors of sciences for work “Constructive existence results and regularity theorems for all weak solutions of classes of nonlinear systems”
- 2019 Grant of the National Academy of Sciences of Ukraine for young scientists for work “Qualitative and quantitative analysis of hemivariational inequalities with multidimensional “reaction-velocity” laws
- 2018 Grant of the President of Ukraine for young scientists for work GP/F75/127-2018 “Methods of non-linear and multi-valued analysis for data processing problems of different nature” (registration number 0118U006047)
- 2018 Award of the National Academy of Sciences of Ukraine
- 2017 Grant of the National Academy of Sciences of Ukraine for young scientists for work “Developing of methods for qualitative and numerical analysis of nonlinear systems, which describe the behavior of concentrated suspension” (registration

number 0117U003434)

- 2017 Scholarships of the Verkhovna Rada of Ukraine for the most talented young scientists for work “Asymptotic behavior and properties of weak solutions of a class of climatological models”
- 2017 Grant of the President of Ukraine for young scientists for work GP/F70/ 94-2017 “Nonlinear effects in climatology models” (registration number 0117U003317)
- 2016 Grant of the President of Ukraine for Doctors of Sciences for work GP/F66/38-2016 “On limit states of mathematical models for viscoelastic fluids” (registration number 0116U005330)
- 2016 State Prize of Ukraine in the Field of Science and Technology for joint work “Optimization methods and computer technologies for modeling and control of information processes and systems” (Decree of the President of Ukraine, April 7, 2017, No. 101/2017)
- 2015 Grant of the President of Ukraine for young scientists for work GP/F61/017 “Long-term forecasts for non-autonomous dissipative dynamical systems of different nature” (registration number 0115U005407)
- 2015 Grant of the National Academy of Sciences of Ukraine for young scientists for work 2284/15(16) “The development and research of qualitative and structural properties for state functions of controlled multidimensional systems with nonlinearities of Caratheodory type” (registration number 0115U005110)
- 2014 Scholarships of the Verkhovna Rada of Ukraine for the most talented young scientists for work “Dynamics of solutions of non-autonomous controlled diffusion processes and fields”
- 2014 Grant of the President of Ukraine for Doctor of Sciences for work GP/F50/049 “Properties of solutions for the 3D Navier-Stokes systems of viscous incompressible fluid” (registration number 0114U007153)
- 2013 Grant of the National Academy of Sciences of Ukraine for young scientists for work №2273/13(14) “Long-term forecasts for state functions and regularity of limit cycles of diffusion-type controlled processes” (registration number 0113U002978)
- 2013 Scholarships of the Verkhovna Rada of Ukraine for the most talented young scientists for work “Partially observed Markov decision-making processes with weakly continuous transition probabilities”
- 2013 Award of the National Academy of Sciences of Ukraine
- 2013 Grant of the President of Ukraine for young scientists for work GP/F49/070

“Structural properties of attracting sets for some nonlinear boundary value problems of Geophysics and Mechanics” (registration number 0113U006191)

- 2012 Grant of the President of Ukraine for young scientists for work GP/F44/076 “Differential-operator inclusions for Earth data analysis” (registration number 0112U008215)
- 2012 Grant of the National Academy of Sciences of Ukraine for young scientists for work №2264-f “Evolution inclusions and variational inequalities for problems of data analysis about Earth” (registration number 0112U004117)
- 2012 Scholarships of the Verkhovna Rada of Ukraine for the most talented young scientists for work “Markov decision-making processes with averaged criteria and weakly continuous transition probabilities”
- 2008 Prize of the National Academy of Sciences of Ukraine for young scientists
- 2005 Prize of the National Academy of Sciences of Ukraine for young scientists
- 2003 Second prize, International Mathematical Competition, IMC 2003, Cluj-Napoca, Romania.

### III. PUBLICATIONS

#### Books

1. Zgurovsky M.Z., Kasyanov P.O. Qualitative and Quantitative Analysis of Nonlinear Systems. Theory and Applications / Springer Series: Studies in Systems, Decision and Control. – Berlin, Cham: Springer, 2018. – XXXIII, 240 p. – DOI: 10.1007/978-3-319-59840-6
2. Zgurovsky, M.Z.; Kasyanov, P.O.; Kapustyan, O.V.; Valero, J.; Zadoianchuk, N.V. Evolution inclusions and variation Inequalities for Earth data processing III. Long-Time Behavior of Evolution Inclusions Solutions in Earth Data Analysis (English) Series: Advances in Mechanics and Mathematics, Vol. 27. Berlin: Springer, 2012, XLI, 330 p. ISBN 978-3-642-28511-0
3. Zgurovsky, Mikhail Z.; Mel'nik, Valery S.; Kasyanov, Pavlo O. Evolution inclusions and variation inequalities for earth data processing. II. Differential-operator inclusions and evolution variation inequalities for Earth data processing. (English) Advances in Mechanics and Mathematics 25. Berlin: Springer. xxv, 274 p. (2011)
4. Zgurovsky, Mikhail Z.; Mel'nik, Valery S.; Kasyanov, Pavlo O. Evolution inclusions and variation inequalities for Earth data Processing. I. Operator inclusions and variation inequalities for earth data processing. (English) Advances in Mechanics and Mathematics 24. Berlin: Springer. xxx, 247 p. (2011)

5. Zgurovsky, M. Z., Kasyanov, P. O., & Mel'nik, V. S. (2008). *Differential-Operator Inclusions and Variation Inequalities in Infinite-Dimensional Spaces*. Kyiv: Naukova Dumka.
6. Kasyanov, P. O., Mel'nik, V. S., & Yasinsky, V. V. (2007). *Evolution inclusions and inequalities in Banach spaces with  $W\lambda$ -pseudomonotone maps*. Kyiv: Naukova Dumka.

### **Papers in Refereed Journals and Refereed Book Chapters**

7. E.A. Feinberg, P.O. Kasyanov, D. Kraemer, Continuity of Parametric Optima for Possibly Discontinuous Functions and Noncompact Decision Sets, submitted to Mathematics of Operations Research.
8. Zgurovsky, M. Z., P. O. Kasyanov, and L. B. Levenchuk. "Formalization of Methods for the Development of Autonomous Artificial Intelligence Systems." Cybernetics and Systems Analysis 59 (2023), 763–771
9. Feinberg, Eugene A., Pavlo O. Kasyanov, and Johannes O. Royset. "Epi-Convergence of Expectation Functions under Varying Measures and Integrands." Journal of Convex Analysis 30 (2023), No. 3, 917-936
10. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, "Solutions for Zero-Sum Two-Player Games with Noncompact Decision Sets," Naval Research Logistics 70 (2023) Issue 5, 493-506
11. Feinberg, Eugene A., and Pavlo O. Kasyanov. "Equivalent conditions for weak continuity of nonlinear filters." Systems & Control Letters 173 (2023): 105458.
12. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, Markov Decision Processes with Incomplete Information and Semi-Uniform Transition Probabilities, SIAM Journal on Control and Optimization, **60**(4), pp. 2488-2513, 2022.
13. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, Semi-Uniform Feller Stochastic Kernels, Journal of Theoretical Probability 36 (2023) 2262–2283
14. Kapustyan O.V., Kasyanov P.O., Taranrts R.M. Strong solutions and trajectory attractors to the thin-film equation with absorption, Journal of Mathematical Analysis and Applications. 2021. – Volume 493, Issue 2, 15 January 2021, 124562
15. E.A. Feinberg, P.O. Kasyanov, MDPs with Setwise Continuous Transition Probabilities, Operations Research Letters, **49**(5), pp. 734-740, 2021.
16. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, Average Cost Markov Decision Processes with Semi-uniform Feller Transition Probabilities, in *Modern Trends in Controlled Stochastic Processes*, (Eds. A. Piunovskiy, Yi Zhang), Springer Nature, Chaim, 2021.

17. Kapustyan O.V., Kasyanov P.O., Valero J. Chain recurrence and  $w$ -limit sets of multi-valued semiflows, Communications on Pure and Applied Analysis. – 2020, vol.19, №4, pp. 2197-2217
18. E.A. Feinberg, P.O. Kasyanov, Y. Liang, “Fatou's Lemma in Its Classic Form and Lebesgue's Convergence Theorems for Varying Measures with Applications to MDPs,” Theory Probability and Its Applications, 65(2), pp. 270-291, 2020.
19. E.A. Feinberg, P.O. Kasyanov, Y. Liang, “Fatou’s Lemma for Weakly Converging Measures under the Uniform Integrability Condition,” Theory Probability and Its Applications, 64(4), pp. 615-631, 2020.
20. Kapustyan O.V., Kasyanov P.O., Valero J., Zgurovsky M.Z. Attractors of multivalued semiflows generated by solutions of optimal control problems, Discrete and Continuous Dynamical Systems. Ser. B. – 2019. – Vol. 24, Iss. 3. – pp. 1229-1242.
21. Garrido T.C., Kapustyan O.V., Kasyanov P.O., Valero J., Zgurovsky M.Z. Preface to the special issue "Dynamics and Control in Distributed Systems", Discrete and Continuous Dynamical Systems. Ser. B. – 2019. – Vol. 24, Iss. 3. – pp. i–v
22. Zgurovsky, M.Z., Gorban, N.V., Kasyanov P.O., Paliichuk, L.S. Qualitative and Quantitative Analysis of Weak Solutions of Energy-Balance Climate Models, Cybernetics and Systems Analysis, volume 55, pages 552–560(2019)
23. Feinberg E.A., Kasyanov P.O., Zgurovsky M.Z. An example showing that A-lower semi-continuity is essential for minimax continuity theorems, Operations Research Letters. - 2018. – Vol. 46, Iss. 4. – pp. 385-388.
24. Kapustyan O.V., Kasyanov P.O., Valero J., Zgurovsky M.Z. Strong attractors for vanishing viscosity approximations of non-Newtonian suspension flows, Discrete and Continuous Dynamical Systems. Ser. B. – 2018. – Vol. 23, Iss. 3. – pp. 1155-1176.
25. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, “Continuity of Equilibria for Two-Person Zero-Sum Games with Noncompact Action Sets and Unbounded Payoffs,” Annals of Operations Research, 2017, published online: DOI 10.1007/s10479-017-2677-y.
26. Zgurovsky M.Z., Gluzman M.O., Gorban N.V., Kasyanov P.O. et al. Uniform Global Attractors for Non-Autonomous Dissipative Dynamical Systems // Discrete and Continuous Dynamical Systems. Ser. B. – 2017. – Vol. 22, Iss. 5. – pp. 2053-2065.
27. Kapustyan O.V., Kasyanov P.O., Valero J. Regularity of global attractors for reaction-diffusion systems with no more than quadratic growth, Discrete and Continuous Dynamical Systems. Ser. B. – 2017. – Vol. 22, Iss. 5. – pp. 1899-1908.

28. Zgurovsky M.Z., Kasyanov P.O. Method of artificial control and the 3D Navier-Stokes system, Springer Optim Appl. – 2017. – 130. – P. 585-600.
29. Valero J., Giménez A., Kapustyan O.V., Kasyanov P.O., Amigó J.M. Convergence of equilibria for numerical approximations of a suspension model, Computers & Mathematics with Applications. – 2016. – Vol. 72, Iss. 4. – pp. 856–878.
30. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, “Uniform Fatou’s Lemma,” Journal Mathematical Analysis and Applications, **444**, pp. 550-567, 2016.
31. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, “Partially Observable Total-Cost Markov Decision Processes with Weakly Continuous Transition Probabilities,” Mathematics of Operations Research, **41**, pp. 656-681, 2016.
32. N.V. Gorban, M.O. Gluzman, P.O. Kasyanov and A.M. Tkachuk Long-time Behavior of State Functions for Budyko Models, Springer International Publishing, Switzerland, 2016, V.A. Sadovnichiy and M.Z. Zgurovsky (eds.), Advances in Dynamical Systems and Control, Studies in Systems, Decision and Control 69, DOI:10.1007/978-3-319-40673-2\_18
33. M.Z. Zgurovsky and P.O. Kasyanov, Uniform Global Attractors for Nonautonomous Evolution Inclusions, Springer International Publishing, Switzerland, 2016, V.A. Sadovnichiy and M.Z. Zgurovsky (eds.), Advances in Dynamical Systems and Control, Studies in Systems, Decision and Control 69, DOI:10.1007/978-3-319-40673-2\_3
34. Kapustyan O.V., Kasyanov P.O. et al. Convergence of Numerical Approximations for a Non-Newtonian Model of Suspensions, International Journal of Bifurcation and Chaos in Applied Sciences and Engineering. – 2015. - Vol. 25, Iss. 14, 1540022
35. E.A. Feinberg and P.O. Kasyanov, “Continuity of Minima: Local Results,” Set-Valued and Variational Analysis, **23**, pp. 485-499, 2015.
36. Kasyanov P.O. On the Existence of Strongly Continuous Physical Solutions for Classes of Autonomous Evolutionary Variational Inequalities, Cybernetics and System Analysis. 2015. – Vol. 51, Iss. 4. – pp. 574-582.
37. Gluzman M.O., Gorban N.V., Kasyanov P.O. Lyapunov type functions for classes of autonomous parabolic feedback control problems and applications, Applied Mathematics Letters. – 2015. – Vol. 39. – P. 19–21.
38. Mark O. Gluzman, Nataliia V. Gorban, Pavlo O. Kasyanov, Lyapunov Functions for Weak Solutions of Reaction-Diffusion Equations with Discontinuous Interaction Functions and its Applications, Nonautonomous Dynamical Systems. 2015, Volume 2, Issue 1, P. 1-11, DOI: 10.1515/msds-2015-0001
39. Mark O. Gluzman, Nataliia V. Gorban, Pavlo O. Kasyanov Lyapunov Functions for Differential Inclusions and Applications in Physics, Biology, and Climatology Continuous

and Distributed Systems II, Studies in Systems, Decision and Control, 2015, Volume 30, pp 233-243, doi: 10.1007/978-3-319-19075-4\_14

40. Mikhail Z. Zgurovsky, Pavlo O. Kasyanov, Liliia S. Paliichuk, Alla M. Tkachuk Dynamics of Solutions for Controlled Piezoelectric Fields with Multivalued “Reaction-Displacement” Law Continuous and Distributed Systems II, Studies in Systems, Decision and Control, 2015, Volume 30, pp 267-276, doi: 10.1007/978-3-319-19075-4\_16
41. Michael Z. Zgurovsky and Pavlo O. Kasyanov Evolution Inclusions in Nonsmooth Systems with Applications for Earth Data Processing: Uniform Trajectory Attractors for Nonautonomous Evolution Inclusions Solutions with Pointwise Pseudomonotone Mappings in [D. Gao et al. (eds.), Advances in Global Optimization, Springer Proceedings in Mathematics & Statistics 95, 2015, pp 283-294] DOI 10.1007/978-3-319-08377-3\_28
42. Oleksiy V. Kapustyan, Pavlo O. Kasyanov, Jose Valero Structure of the Global Attractor for Weak Solutions of a Reaction-Diffusion Equation Applied Mathematics & Information Sciences, Vol. 9, No. 5, 2257-2264 (2015) <http://dx.doi.org/10.12785/amis/090506>
43. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, “Convergence of Probability Measures and Markov Decision Models with Incomplete Information,” Proceedings of the Steklov Institute of Mathematics, **287**, pp. 96-117, 2014.
44. Kapustyan O.V., Kasyanov P.O., Valero J. Regular Solutions and Global Attractors for Reaction-Diffusion Systems without Uniqueness, Communications on Pure and Applied Analysis. – 2014. – Vol. 13, Iss. 5. – pp. 1891-1906.
45. Kapustyan O.V., Kasyanov P.O., Valero J. Structure and regularity of the global attractor of a reaction-diffusion equation with non-smooth nonlinear term, Discrete and Continuous Dynamical Systems. – 2014. – Vol. 34, Iss. 10. – pp. 4155–4182.
46. E.A. Feinberg, P.O. Kasyanov, M. Voorneveld, “Berge’s Maximum Theorem for Noncompact Image Sets,” Journal of Mathematical Analysis and Applications, **413**, pp. 1040-1046, 2014.
47. Gorban N.V., Kasyanov P.O., Kapustyan O.V. Uniform trajectory attractor for non-autonomous reaction–diffusion equations with Caratheodory’s nonlinearity, Nonlinear Analysis: Theory, Methods and Applications – 2014. – Vol. 98. – pp. 13-26.
48. E.A. Feinberg, P.O. Kasyanov, N.V. Zadoianchuk, “Fatou’s Lemma for Weakly Converging Probabilities,” SIAM Theory Probab. Appl., **58**, pp. 683-689, 2014.
49. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, “Optimality Conditions for Partially Observable Markov Decision Processes,” in Continuous and Distributed Systems: Theory and Applications, M.Z. Zgurovsky, V.A. Sadovnichiy (editors), Springer, Cham, Switzerland, pp. 251-264, 2014.



50. M.Z. Zgurovsky, P.O. Kasynov, L.S. Paliichuk Automatic Feedback Control for One Class of Contact Piezoelectric Problems System Research & Information Technologies, 2014, № 1, 56-68
51. Kas'yanov, P. O., Paliichuk, L. S., & Tkachuk, A. N. (2014). Method of multivalued operator semigroup to investigate the long-term forecasts for controlled piezoelectric fields. Chebyshevskii Sbornik, 15(2), 21-32.
52. E.A. Feinberg, P.O. Kasyanov, and N.V. Zadoianchuk, “Berge’s Theorem for Noncompact Image Sets,” Journal of Mathematical Analysis and Applications, **397**, pp. 255-259, 2013.
53. Kasyanov P.O., Toscano L., Zadoianchuk. N.V. A criterion for the existence of strong solutions for the 3D Navier–Stokes equations, Applied Mathematics Letters. – 2013. – Vol. 26, Iss. 1. – pp. 15-17.
54. Kasyanov P.O., Toscano L., Zadoianchuk. N.V. Regularity of Weak Solutions and Their Attractors for a Parabolic Feedback Control Problem, Set-Valued and Variational Analysis. - 2013. – Vol. 21, Iss. 2. - P. 271-282.
55. Gorban N.V., Kasyanov P.O., Kapustyan O.V., Palichuk L.S. On global attractors for autonomous wave equation with discontinuous nonlinearity, Solid Mechanics and Its Applications. – 2013. – vol. 211. – P. 221-237.
56. Pavlo O. Kasyanov, Luisa Toscano, Nina V. Zadoianchuk Topological Properties of Strong Solutions for the 3D Navier-Stokes Equations, Solid Mechanics and Its Applications. – 2013. – vol. 211. – P. 181-187.
57. Gorban N.V., Kasyanov P.O. On Regularity of All Weak Solutions and Their Attractors for Reaction-Diffusion Inclusion in Unbounded Domain Equations, Solid Mechanics and Its Applications. – 2013. – vol. 211. – P. 205-220.
58. Michael Z. Zgurovsky, Pavlo O. Kasyanov Multivalued Dynamics of Solutions for Autonomous Operator Differential Equations in Strongest Topologies, Continuous and Distributed Systems: Theory and Applications, Solid Mechanics and Its Applications, Volume 211, 2013, pp 149-162
59. Oleksiy V. Kapustyan, Pavlo O. Kasyanov, José Valero, Mikhail Z. Zgurovsky Structure of Uniform Global Attractor for General Non-Autonomous Reaction-Diffusion System, Continuous and Distributed Systems: Theory and Applications, Solid Mechanics and Its Applications, Volume 211, 2013, pp 163-180.
60. Zgurovsky M.Z., Kasyanov P.O., Zadoianchuk N.V. Long-time behavior of solutions for quasilinear hyperbolic hemivariational inequalities with application to piezoelectricity problem, Applied Mathematics Letters. – 2012. – Vol. 25, Iss. 10. – pp. 1569-1574.

61. E.A. Feinberg, P.O. Kasyanov, and N.V. Zadoianchuk, "Average-Cost Markov Decision Processes with Weakly Continuous Transition Probabilities," Mathematics of Operations Research, **37**, pp.591-607, 2012.
62. Kasyanov P.O., Toscano L., Zadoianchuk N.V. Long-Time Behaviour of Solutions for Autonomous Evolution Hemivariational Inequality with Multidimensional "Reaction-Displacement" Law, Abstract and Applied Analysis. – 2012. – Vol. 2012. – 21 p.
63. P.O. Kasyanov Multivalued dynamics of solutions of autonomous operator differential equations with pseudomonotone nonlinearity, Mathematical Notes, Volume 92, Numbers 1-2 (2012), 205-218, DOI: 10.1134/S0001434612070231
64. Zadoianchuk, N. V., & Kasyanov, P. O. (2012). Dynamics of solutions of a class of second-order autonomous evolution inclusions. Cybernetics and Systems Analysis, 48(3), 414-428.
65. O.V. Kapustyan, P.O. Kasyanov, J. Valero Pullback attractors for a class of extremal solutions of the 3D Navier-Stokes equations, Journal of Mathematical Analysis and Applications. – Volume 373, Issue 2, 2011, Pages 535 – 547, doi:10.1016/j.jmaa.2010.07.040
66. P.O. Kasyanov, V.S. Mel'nik, S. Toscano Solutions of Cauchy and periodic problems for evolution inclusions with multi-valued  $\lambda$ -pseudomonotone maps, Journal of Differential Equations. - Volume 249, Issue 6, 2010, Pages 1258-1287. doi:10.1016/j.jde.2010.05.008
67. M.Z. Zgurovsky, P.O. Kasyanov, J. Valero Noncoercive evolution inclusions for  $S_k$  type operators, International Journal of Bifurcation and Chaos. – Vol. 20, No. 9 (2010) P. 2823–2834
68. Kasyanov, P. O. (2010). Differential-operator inclusions and multivariational inequalities with pseudomonotone mappings. Cybernetics and Systems Analysis, 46(2), 282-290.
69. Zadoianchuk, N. V., and P. O. Kas'yanov. Faedo–galerkin method for second-order evolution inclusions with  $W_\lambda$ -pseudomonotone mappings. Ukrainian Mathematical Journal 61.2 (2009).
70. Kasyanov, P. O., Zadoianchuk, N. V., & Yasinsky, V. V. (2009). Periodic solutions for a class of nonlinear hyperbolic evolution equations. Cybernetics and Systems Analysis, 45(5), 774.
71. Zadoianchuk, N. V., & Kas'yanov, P. O. (2009). Singular-perturbation method for nonlinear second-order evolution inclusions with Volterra operators. Nonlinear Oscillations, 1(12), 27-44.
72. Perestyuk M.O., Kasyanov P.O., Zadoianchuk N.V. On solvability of second order evolution inclusions with Volterra type operators, Miskolc Mathematical Notes. – 2008. – Vol. 9, No. 2. – P. 119-135.

73. Pavlo Kasyanov, Valeriy Mel'nik, Anna Maria Piccirillo On some approximations and main topological descriptions for special classes of Banach spaces with integrable derivatives, Methods of Functional Analysis and Topology – 2008. – Vol. 14, № 3. – P. 255-270.
74. M.O. Perestyuk, P.O. Kasyanov, N.V. Zadoyanchuk On Faedo-Galerkin method for evolution inclusions with pseudomonotone maps, Memoirs on Differential Equations and Mathematical Physics – 2008. – Vol. 44. – P. 105-132.
75. Pavlo O. Kasyanov, Valeriy S. Mel'nik, Anna M. Piccirillo Local subdifferentials and multivariational inequalities in Banach and Frechet spaces, Opuscula mathematica. – 2008. – №3. – P. 295-311.
76. Kapustyan, V. O., Kas'yanov, P. O., & Kohut, O. P. (2008). On the solvability of one class of parameterized operator inclusions. Ukrainian Mathematical Journal, 60(12).
77. Kas'yanov, P. O., & Mel'nyk, V. S. (2008). Evolution inequalities with noncoercive  $w_{\{\lambda_0\}}$ -pseudomonotone volterra-type mappings. Ukrainian Mathematical Journal, 60(11).
78. Pavlo Kasyanov, Valery Melnik and Jose Valero On the method of approximation for evolutionary inclusions of pseudomonotone type, Bulletin of the Australian Mathematical Society. – 2008. – Volume 77, Issue 01. – pp 115-143.
79. Kasyanov, P. O., Melnik, V. S., Toscano, S., & Zadoyanchuk, N. V. (2008). Periodic solutions of evolutionary equations in the class of nonreflexive Banach spaces. Journal of Automation and Information Sciences, 40(9).
80. Pavlo Kasyanov, Valeriy Mel'nik, Luisa Toscano The multivalued penalty method for evolution variational inequalities with pseudomonotone multivalued maps, Nonlinear Oscillations - 2007. – v. 10, №4. – P. 481-509.
81. Zadoyanchuk, N. V., & Kas'yanov, P. O. (2007). Faedo-Galerkin method for nonlinear second-order evolution equations with Volterra operators. Nonlinear Oscillations, 10(2), 203-228.
82. Kasyanov, P. O., & Melnik, V. S. (2007). On solvability of differential-operator inclusions and evolution variation inequalities generated by  $w$ -pseudomonotone maps type. Ukr. Math. Bull, 4, 535-581.
83. Kas'yanov, P. O., Mel'nik, V. S., & Toscano, L. (2007). Multivalued penalty method for evolution variational inequalities with  $\lambda$  0-pseudomonotone multivalued maps. Nonlinear Oscillations, 10(4)
84. Kas'yanov, P. O., Mel'nik, V. S., & Toscano, S. (2006). Periodic solutions of nonlinear evolution equations with  $W_{\{\lambda_0\}}$ -pseudomonotone maps. Nonlinear Oscillations, 9(2), 181-206.

85. Kasyanov, P. O., Mel'nik, V. S., & Piccirillo, A. M. (2006). On Schauder basis in some Banach spaces. Reports NAS of Ukraine, 4, 23-30.
86. Kasyanov, P. O., & Melnik, V. S. (2005). Faedo–Galerkin method differential-operator inclusions in Banach spaces with maps of  $w\lambda_0$ -pseudomonotone type. Nats. Acad. Sci. Ukr., Kiev, Inst. Math., Prepr, 1, 82-105.
87. Kasyanov, P. O. Galerkin's method for one class differential-operator inclusions. Dopov. Nats. Akad. Nauk Ukr 9 (2005): 20-24.
88. Kas'yanov, P. O., & Mel'nyk, V. S. (2005). On properties of subdifferential mappings in Frechet spaces. Ukrainian Mathematical Journal, 57(10), 1621-1634.
89. Kasyanov, P. O. (2005). Galerkin method for a class of differential-operator inclusions with set-valued mappings of pseudomonotone type. Naukovi visti NTUU "KPI", (2), 139-151.
90. Kapustyan, O. V., & Kas'yanov, P. O. (2003). Global attractor for a nonautonomous inclusion with discontinuous right-hand side. Ukrainian Mathematical Journal, 55(11), 1765-1776.

### **Some Selected Papers in Conference Proceedings**

91. Feinberg, E. A., Kasyanov, P. O., & Zgurovsky, M. Z. (2021, December). A Class of Solvable Markov Decision Models with Incomplete Information. In 2021 60th IEEE Conference on Decision and Control (CDC) (pp. 1615-1620). IEEE.
92. Zgurovsky, M. Z., D'Apice, C., De Maio, U., Gorban, N. V., Kasyanov, P. O., Kapustyan, O. V., ... & Valero, J. (2021). Uniform Global Attractor for a Class of Nonautonomous Evolution Hemivariational Inequalities with Multidimensional "Reaction-Velocity" Law. In Contemporary Approaches and Methods in Fundamental Mathematics and Mechanics (pp. 347-368). Springer, Cham.
93. Zgurovsky, M.Z., Kasyanov, P.O., Gorban, N.V., Paliichuk, L.S. Asymptotic translation uniform integrability and multivalued dynamics of solutions for non-autonomous reaction-diffusion equations, Understanding Complex Systems. – 2019. – Vol. P. 413-423
94. Mikhail Z. Zgurovsky, Pavlo O. Kasyanov Uniform Trajectory Attractors for Nonautonomous Dissipative Dynamical Systems Continuous and Distributed Systems II, Studies in Systems, Decision and Control, 2015, Volume 30, pp 221-232, doi: 10.1007/978-3-319-19075-4\_13
95. Kasyanov P., Feinberg E. Berge's Maximum Theorem for Non-compact Image Sets and Its Applications, Third Rutgers Applied Probability Conference, June 6 & 7, 2014. – NJ: The State University of New Jersey, 2014.

96. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, "Convergence of Value Iterations for Total-Cost MDPs and POMDPs with General State and Action Sets," Proceedings of 2014 IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning (ADPRL), IEEE SSCI 2014, Orlando, FL, December 9-12, pp. 41-48, 2014.
97. E.A. Feinberg, P.O. Kasyanov, M.Z. Zgurovsky, "Optimality conditions for total-cost partially observable Markov decision processes," Proceedings of the 52th IEEE Conference on Decision and Control and European Control Conference, Florence, Italy, December 10-13, pp. 5728-5732, 2013.
98. E.A. Feinberg, P.O. Kasyanov, and N.V. Zadojanchuk, "Average-cost Markov decision processes with weakly continuous transition probabilities." International Conference Stochastic Optimization and Optimal Stopping, Book of Abstracts, Moscow, 24-28 September 2012, pp. 34-37.
99. Zgurovsky M.Z. Noncoercive evolution inclusions for Sk type operators / M.Z. Zgurovsky, P.O. Kasyanov, J. Valero, Nonlinear Analysis and Applications: International Conference, 2-4 Apr.: Book of Abstracts. – K., 2009. – P. 76.
100. Kasyanov P., Valero J. On the method of investigation for evolutionary inclusions // Book of Abstracts of International Workshop on Dynamical Systems and Multidisciplinary Applications. – Elche, Spain, 2008. – P. 10.
101. Ivanenko V., Kasyanov P., Melnik V. The Extremal Solutions of Nonlinear Singular Boundary Value Problems, SIAM Conference on Analysis of Partial Differential Equations (PD07).
102. Ivanenko V., Kasyanov P., Toscano L. The Multivalued Penalty Method for Evolution Variational Inequalities with  $w\lambda$ -Pseudomonotone Multivalued Maps, SIAM Conference on Analysis of Partial Differential Equations (PD07).
103. Kasyanov P.O., Melnik V.S. On solvability of differential-operator inclusions and evolutional variational inequalities generated by maps of  $w\lambda$ -pseudomonotone type // Book of abstracts of International conference "Nonlinear Partial Differential Equations". — Yalta, Ukraine, 2007. — P. 35.
104. Kasyanov P.O., Melnik V.S. The penalty method for evolution variation inequalities with  $w\lambda$ -pseudomonotone maps, Book of Abstracts of International Conference on Differential Equations. – Lviv, 2006. – P. 130.
105. Kasyanov, P. O., & Mel'nik, V. S. (2006). Differential-operator inclusions in Banach spaces with  $W$ -pseudomonotone maps. Nonlinear Boundary Problems.
106. Kasyanov P.O., Mel'nik V.S. Differential-operator inclusions in Banach spaces with  $w\lambda$ -pseudomonotone maps, Book of abstracts of International conference "Nonlinear Partial Differential Equations". – Donetsk, 2005. – P. 51.

107. Kasyanov P.O., Mel'nik V.S. Galerkin method for differential-operator inclusions in Banach spaces with maps of  $w_\lambda$ -pseudomonotone type, Book of abstracts of International workshop of free boundary flows and related problems of analysis. – Kiev, 2005. – P. 22.

## IV. SYNERGISTIC ACTIVITIES

### Teaching

**Graduate Courses:** Elements of Nonlinear Analysis, Multivalued Analysis and Its Applications, Advances Statistics and Quantitative Methods (Igor Sikorsky Kyiv Polytechnic Institute), Deep Reinforcement Learning (Igor Sikorsky Kyiv Polytechnic Institute), Research Advances (Second University of Naples, University of Salerno),

**Undergraduate Courses:** Analysis III, IV (Igor Sikorsky Kyiv Polytechnic Institute), Differential Equations (Igor Sikorsky Kyiv Polytechnic Institute and National Taras Shevchenko University of Kyiv), Variation Calculus (Igor Sikorsky Kyiv Polytechnic Institute and National Taras Shevchenko University of Kyiv), Introduction to Reinforcement Learning (Igor Sikorsky Kyiv Polytechnic Institute)

### University Service:

Academic Council of the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”,  
Fellow, since 2013.

Academic Council of the Educational and Scientific Complex “Institute for applied system analysis”, National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”,  
Head, 2015-2022.  
Fellow 2012 – present

Administrative Council of the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”,  
Fellow, since 2015.

Bureau of the department of Computer Science of the National Academy of Sciences of Ukraine,  
Member, since 2020.

Presidium of the National Academy of Sciences of Ukraine, Commission for Work with Scientific Youth of the National Academy of Sciences of Ukraine  
Member, since 2020.

International Community for CODATA, ICSU,  
Fellow, since 2011.

INFORMS  
Fellow, since 2022

### **Recently Organized Conferences:**

60th IEEE Conference on Decision and Control (CDC), co-chair of the session "Advances in Stochastic Control with Partial Information II"

### **Ph. D. Students**

2006-2009 Nina Zadoianchuk, National Taras Shevchenko University of Kyiv,

2021-present Andriy Titarenko and Anton Bazdyriev, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv/Ukraine

### **Ph. D. and Dr. Hab. Theses Directed:**

2010-2017 Olha Kupenko (Kogut), dr. hab, Current position: professor of the Dnipro Polytechnic, Scholarship of the Verhovna Rada of Ukraine (2019);

2011-2018 Liliia Paliichuk, PhD, Current position: Junior Researcher and Assistant Professor, Educational and Scientific Complex "Institute for Applied System Analysis", National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv/Ukraine, Scholarship of the Cabinet of Ministers of Ukraine (2018-2020).

2012-2018 Olha Khomenko, PhD Current position: Junior Researcher and Assistant Professor, Educational and Scientific Complex "Institute for Applied System Analysis", National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv/Ukraine.

### **External Funding**

Principal Investigator of the following projects supported by the UNIVERSITY OF KANSAS CENTER FOR RESEARCH, INC., USA:

12.2023-12.2024 Development of an integrated approach to high-throughput modeling of protein complexes, protein structure-function relationships, and prediction of the phenotypic effects of single amino acid variation based on the kinetic aspects of protein association in cellular environment (Agreement for Services No. BSA24078, registration number 0124U001308) 23.000 USD

Principal Investigator of the following projects supported by the National Academy of Sciences of Ukraine:

01.2019-12.2023 №2295-f “Stochastic theory developing for scenario modeling in machine learning and decision making” (registration number 0119U000117) 120.000 USD

01.2017-12.2021 №2286v “Development of methods for qualitative and numerical analysis of nonlinear systems for analysis of large data in biology, medicine, climatology” (registration number 0117U000206) 70.000 USD

01.2014-12.2018 №2275-f “To develop and investigate the optimality conditions for the general classes of partially observed evolutionary decision-making processes.” (registration number 0114U00091) 100.000 USD

01.10-12.14 №2256-p “Game and optimization models and methods of resource distribution in the technical, economic and social processes” (registration number 0110U000034) 100.000 USD

1.2012 - 12.2016 №2262v “Long-term forecasts for state functions of controlled geophysical nonlinear systems with multidimensional superpotential laws” (registration number 0112U001229) 120.000 USD

Principal Investigator of the following projects supported by the Ministry of Education and Sciences of Ukraine:

01.2014-12.2016 №2709-f “The formalization of complex nonlinear analysis methods and optimal control for complex distributed systems of different nature” (registration number 0114U001520) 40.000 USD

01.2011- 12.2013 №2405-f “Differential pursuit games with quality functional and their application in tasks of dynamic resource distribution” (registration number 0111U000056) 40.000 USD

## **Industrial Reports**

№2291-p “Developing an information and analytical system for optimal distribution of investment resources under uncertainty and risks” (registration number 0118U003027), Prepared for World Data Center for Geoinformatics and Sustainable Development, CODATA, ICSU, 2020, 240 p.

№2280-p “Development of methods for optimization operation decisions for hierarchically structured distributed systems” (registration number 0115U002499), prepared for Energy Department of Ukraine, 2017, 205 p.



№2254-f “Development of the theory of differential games with a random obstacle and an optimization approach to the solution of variational inequalities” (registration number 0109U000114), Prepared for Bolshevik factory, 2013, 301 p.

## V. Collaborators and Other Affiliations

### Collaborators and Co-Editors

**Eugene A. Feinberg**, Distinguished Professor, Department of Applied Mathematics and Statistics  
Stony Brook University

**David Kraemer**, PhD student, Department of Applied Mathematics and Statistics  
Stony Brook University

**Liudmyla B. Levenchuk**, PhD student at the Igor Sikorsky Kyiv Polytechnic Institute

**Johannes O. Royset**, Professor of Operations Research at the Naval Postgraduate School

**Andriy M. Tytarenko**, PhD student at the Igor Sikorsky Kyiv Polytechnic Institute

**Ilya A. Vakser**, Professor, Director of the KU Center for Computational Biology

**Michael Zgurovsky**, Rector of Igor Sikorsky Kyiv Polytechnic Institute

### Editorial Boards

Associate Editor, Journal of Applied Mathematics and Computing, 2013-2022.  
Editor, Chebyshevskii Sbornik, 2013-2022.

Associate Editor, The Edited Collection of Papers “Continuous and Distributed Systems: Theory and Applications”, Series: Solid Mechanics and Its Applications, Vol. 211 Zgurovsky, Mikhail Z.; Sadovnichiy, Victor A. (Eds.), XXIII, 387 pp. 40 illus., 50 illus. in color., ISBN 978-3-319-03145-3, 2014.

Associate Editor, The Edited Collection of Papers “Continuous and Distributed Systems II: Theory and Applications”, Series: Studies in Systems, Decision and Control, Vol. 30, Sadovnichiy, Viktor A., Zgurovsky, Mikhail Z. (Eds.), XVII, 333 p. 33 illus., 14 illus. in color., ISBN 978-3-319-19074-7, 2015.

Associate Editor, The Edited Collection of Papers “Advances in Dynamical Systems and Control”, Series: Studies in Systems, Decision and Control, Vol. 69, Sadovnichiy, Viktor A., Zgurovsky, Mikhail Z. (Eds.), XXII, 471 p., 32 b/w illustrations, 39 illustrations in colour, ISBN 978-3-319-40672-5, 2016.

Associate Editor, The Edited Collection of Papers “Modern Mathematics and Mechanics:

Fundamentals, Problems and Challenges”, Series: Understanding Complex Systems ,  
Sadovnichiy, Viktor A., Zgurovsky, Mikhail Z. (Eds.), XXII, 557p., 33 b/w illustrations, 32  
illustrations in colour, ISBN 978-3-319-96754-7, 2019

Guest Editor, Discrete & Continuous Dynamical Systems – B, March 2019, Volume 24, Issue 3,  
Special issue on dynamics and control in distributed systems: Dedicated to the memory of  
Valery S. Melnik (1952-2007)

Editor, International Journal “System Research and Information Technologies”, since 2013.