Name	Konstantin Avramov
Position, Department/Faculty	Professor, Dept. of Strength of Aircraft
Academic Degree, Academic Title	Corresponding member of National Academy of Science of Ukraine, Doctor of Engineering Science, Prof.
Email:	kvavramov@gmail.com
Scopus Author ID:	6701660322
Web of Science ResearcherID:	**1942839**
ORCID iD:	**0000-0002-8740-693X**
Google Scholar:	https://scholar.google.com/citations?hl=ru&user=s1h4XhQAAAAJ

EDUCATION:

Basic education (university, major, year of graduation):
Kharkiv Polytechnic Institute is finished at 1991 on specialty "Dynamic and Strength of Machines"

Postgraduate/Doctoral studies:
1994 the PhD thesis was finished. Title: "Nonlinear chaotic vibrations of internal combustion engines"
2004 Doctor of Science thesis was finished. Title "Stability and bifurcations of nonlinear oscillations of deformable solids"
2024 Selected as corresponding member of National Academy of Science of Ukraine

WORK EXPERIENCE:

Professional Career (Workplace, Years, Position):

1991-2005 Assistant of Professor, Associate Professor, Professor of National technical University "Kharkiv Polytechnical Istitute"
From 2005 up to now: Research professor, Head of Dept. "Nonlinear mechanics and mathematical modeling" Institute of Power Machines and Systems of NAS of Ukraine

Takes temporal positions of visitor professor

- **June 2002**, Institute of Thermo mechanics, Prague, Czech, collaboration with Dr. J. Horacek, Dr. I. Zolotarev
- **May 2003** Department of biomechanics, Technical University of Lodz, Lodz, Poland (collaboration with Prof. J. Awrejcewicz).

- **May**, June **2004.** Visitor Professor, Dipartimento di Ingegneria Meccanica e Civile, Universita di Modena e Reggio Emilia, Модена, I-41100 Италия (співробітництво з Prof. F. Pellicano)
- **June-August 2005**, Visitor Professor, Department of Mechanical Engineering, The University of Michigan, Ann Arbor, USA (collaboration with Prof. C. Pierre and Prof. S. Shaw)
- **December 2005**, Visitor Professor, Dept. of Applied Mechanics, Technical University of Lublin, Lublin, Poland (collaboration c Prof. J. Warminski).
- **May-September 2006,** Visitor Professor, Faculty of Mechanical Engineering, Technion – Israel Institute of Technology, Haifa, Israel (collaboration with Prof. O. Gendelman)

Teaching Experience:

Gives the following lecture courses:

- Theoretical mechanics
- Operations research
- Gas and Fluid Mechanics
- Aerodynamics
- Theory of elasticity
- Theory of shells and plates
- Partial differential equations
- Theory of nonlinear oscillations and stability
- Analytical mechanics
- Finite element method
- Mechanics of aircrafts
- Strength of aircrafts

Experience in International or National Projects:

1. National research foundation of Ukraine

«Applications of thin-walled composite sandwich structures with additively manufactured honeycombs to increase the dynamical strength and decrease of unit weight of missiles and pilotless vehicle» (2024–2025), project 2023.04/0001.

2. Grant of NATO, Programme The Science for Peace and Security (SPS)

«Composite Metamaterials for Aerospace Structures – CoMetA»

(2024–2026), project SPS G6176.

3. National research foundation of Ukraine

«Topology optimization and increase of strength characteristics of multilayer shells and solid bodies using additive manufacturing» (2020-2023), project 2020.02./0128.

4. Agreement № Д3/71-2019 at 02.09.2019 on science and engineering development «Development of software for dynamics and strength of thin-walled nanocomposite structures» Customer– Ministry of Science and Education of Ukraine, 2019-2020.

5. Agreement with Yuzhnoye State Design Office, № 362-29 at 12 march 2009 «Development calculations methods for longitudinal oscillations of pipelines and their damping».

6. Agreement with Yuzhnoye State Design Office № 381-29 at 2 October 2009 «Development of algorithms for loads on elements of aircrafts».

7. Agreement with Yuzhnoye State Design Office № 1058-14 at 01.03.2015 «Development of methods and software for dynamic stress state of shell structures under impact loads.

8. Agreement with Yuzhnoye State Design Office № 148-16 at 01.03.2016 «Development of methods for acoustic loads on equipment of launch vehicle at maximal dynamic pressure».

9. Agreement with Yuzhnoye State Design Office № 149-16 at 01.04.2016 «Development of methods and software for fracture of warheads elements under impact loads».

10. Agreement with Yuzhnoye State Design Office № V-53-2017 at 15.02.2017 «Development of acoustic loads on starts of launch vehicle».

11. Agreement with Yuzhnoye State Design Office № V-55-2017 at 17.05.2017 «Numerical simulation of mechanical state of fastening during transportation».

RESEARCH ACTIVITIES:

Main Research Areas:

- Asymptotic methods
- Applied theory of bifurcation and chaos
- Nonlinear normal modes
- Thin-walled structures,shells and sandwich structures
- Gas/ structure interactions
- Vibrations of machines and mechanisms
- Dynamic and strength of launch vehicle
- Strength of energetic equipment
- Nonlinear absorption of vibrations
- Nanotechnology, nanocomposites
- Additive technology

Number of Publications (Scopus, WoS, others):
Scopus: 155; Wos: 120, others 560

Monographs, Textbooks:
4

Participation in Scientific Conferences:
214

TEACHING ACTIVITIES:

Courses Taught:

- Theoretical mechanics
- Operations research
- Gas and Fluid Mechanics
- Aerodynamics
- Theory of elasticity
- Analytical mechanics
- Finite element method
- Mechanics of aircrafts
- Strength of aircrafts

Author Courses, Academic Programs:

- Theory of shells and plates
- Partial differential equations
- Theory of nonlinear oscillations and stability

GRANTS AND PROJECTS:

Participation in International and National Projects:

1. National research foundation of Ukraine

«Applications of thin-walled composite sandwich structures with additively manufactured honeycombs to increase the dynamical strength and decrease of unit weight of missiles and pilotless vehicle» (2024–2025), project 2023.04/0001.

2. Grant of NATO, Programme The Science for Peace and Security (SPS)

«Composite Metamaterials for Aerospace Structures – CoMetA» (2024–2026), project SPS G6176.

3. National research foundation of Ukraine

«Topology optimization and increase of strength characteristics of multilayer shells and solid bodies using additive manufacturing» (2020-2023), project 2020.02./0128.

4. Agreement № Д3/71-2019 at 02.09.2019 on science and engineering development «Development of software for dynamics and strength of thin-walled nanocomposite structures» Customer– Ministry of Science and Education of Ukraine, 2019-2020.

5. Agreement with Yuzhnoye State Design Office, № 362-29 at 12 march 2009 «Development calculations methods for longitudinal oscillations of pipelines and their damping».

6. Agreement with Yuzhnoye State Design Office № 381-29 at 2 October 2009 «Development of algorithms for loads on elements of aircrafts».

7. Agreement with Yuzhnoye State Design Office № 1058-14 at 01.03.2015 «Development of methods and software for dynamic stress state of shell structures under impact loads.

8. Agreement with Yuzhnoye State Design Office № 148-16 at 01.03.2016 «Development of methods for acoustic loads on equipment of launch vehicle at maximal dynamic pressure».

9. Agreement with Yuzhnoye State Design Office № 149-16 at 01.04.2016 «Development of methods and software for fracture of warheads elements under impact loads».

10. Agreement with Yuzhnoye State Design Office № V-53-2017 at 15.02.2017 «Development of acoustic loads on starts of launch vehicle».

11. Agreement with Yuzhnoye State Design Office № V-55-2017 at 17.05.2017 «Numerical simulation of mechanical state of fastening during transportation».

PROFESSIONAL ACHIEVEMENTS AND AWARDS:

Honorary Titles:
2024 selected as Corresponding members of Nationally Academy of science of Ukraine

Distinctions, Awards, Prizes:
Awarded by President Zelensky by order "For merits"

Membership in Professional Associations:

Society for Industrial and Applied Mathematics (SIAM, USA),
GAMM (Germany)

INTERNATIONAL ACTIVITIES:

Cooperation with Foreign Universities:

- **Prof. C. Pierre** (University of Illinois, Urbana – Champaign, USA),
- **Prof. F. Pellicano** (Dipartimento di Ingegneria Meccanica e Civile, Universita di Modena e Reggio Emilia, Modena, I-41100 Italy),

- **Prof. M. Amabili** (Department of Mechanical Engineering, McGill University, Québec, Canada),
- **Dr. J. Horacek, Dr. I. Zolotarev** (Institute of Themomechanics AS, Czech Republic, Prague),
- **Prof. O. Gendelman** (Technion- Izrael Institute of Technology, Haifa, Izrael),
- **Prof. J.M.Baltazar** (State University of Sao Paulo at Rio Claro, Rio Claro, Brazil),
- **Prof. J. Awrejcewicz (**Dept. of Automatics and Biomechanics, Technical University of Lodz, Lodz, Poland),
- **Prof. J. Warminski** (Dept. of Applied Mechanics, Technical University of Lublin, Lublin, Poland),
- Prof. **Yeon-Sun Choi** (Sungkyukwan University, Suwon, Korea).
- Prof. **Johannes Edelmann**, Vienna Technical University

SELECTED PUBLICATIONS:

Key Articles (Scopus, WoS, others):

1. K. Avramov, Nonlinear normal modes of multi-walled nanoshells with consideration of surface effect and nonlocal elasticity. International Journal of Nonlinear Mechanics, 159 (2024) 104622 https://doi.org/10.1016/j.ijnonlinmec.2023.104622
2. Yu. Mikhlin, K. Avramov. Nonlinear normal modes of vibrating mechanical systems: 10 years of progress. ASME Applied Mechanics Review, 2024, *Appl. Mech. Rev*. Sep 2024, 76(5): 050801 (24 pages), **Paper No:** AMR-23-1022 https://doi.org/10.1115/1.4063593
3. K. Avramov, I. Grebennik Nonlinear modal analysis of multi-walled nanotube oscillations using nonlocal anisotropic elastic shell model. Nonlinear dynamics, 2023, https://doi.org/10.1007/s11071-023-08978-7
4. B. Uspensky, K. Avramov, I. Derevianko, K. Maksymenko-Sheiko. Vibrations of cylindrical sandwich shell with fused deposition processed honeycomb core and carbon nanotubes reinforced composite faces sheets. Journal of Vibration Engineering and Technology, 2024, 12(2),p.2003–2023 10.1007/s42417-023-00960-2
5. I. Derevianko, B. Uspensky, K. Avramov, A. Salenko, K. Maksymenko-Sheiko. Experimental and numerical analysis of mechanical characteristics of fused deposition

processed honeycomb fabricated from PLA or ULTEM 9085. Journal of Sandwich Structures and Materials, 2023, Vol.25, p.264-283, DOI: 10.1177/10996362221137292

6. K. Avramov, S. Malyshev. Bifurcations and chaotic forced vibrations of cantilever beams with breathing cracks. Engineering Fracture Mechanics 214 (2019) 289- 303.
7. K. Avramov. Longitudinal-flexural self-sustained vibrations of nanotube conveying fluid. East European Journal of Physics, Vol.5 No.2, 2018, p. 13-24.
8. K.V. Avramov. Nonlinear vibrations characteristics of single-walled carbon nanotubes via nonlocal elasticity. International Journal of Nonlinear Mechanics, Vol.117 (2018), p.149-160.
9. G. Martynenko, M. Chernobryvko, K. Avramov, V. Martynenko, A. Tonkonozhenko, V. Kozharin , D. Klymenko. Numerical simulation of missile warhead operation. Advances in Engineering Software 123 (2018), p.93-103
10. 406. K. V. Avramov, M.V. Chernobryvko, A. M. Tonkonogenko, P.G. Degtyarenko. Dynamics of solid propellant motor composite casing under impact pressure. Meccanica, 2018, Vol 53: 3339-3353.
11. K.V. Avramov, S.E. Malyshev, Periodic, quasi-periodic and chaotic geometrically non-linear forced vibrations of shallow cantilever shell, Acta Mechanica.229, 1579-1595 (2018)
12. B. Uspensky, K. Avramov. Numerical Analysis of Nonlinear Modes of Piecewise Linear Systems Torsional Vibrations. Meccanica (2017), Vol.52: 3743-3757
13. K. Avramov, T. Raimberdiyev. Bifurcations behavior of bending vibrations of beams with two breathing cracks. Engineering Fracture Mechanics 178 (2017), 22-38.
14. . K. Avramov, T. Raimberdiyev. Modal asymptotic analysis of sub-harmonic and quasi-periodic flexural vibrations of beams with fatigue crack. Nonlinear Dynamics 2017, 88: 1213-1228.
15. K.V. Avramov, S.V. Papazov, I. D. Breslavsky. Dynamic instability of shallow shells in three-dimensional incompressible inviscid potential flow. Journal of Sound and Vibration 394(2017), 593-611.

16.. B.V. Uspenskii, K.V. Avramov. Nonlinear normal modes of essentially nonlinear piecewise systems under periodic excitation. Journal of Mathematical Sciences, Vol. 226, No.2, 2017, p.104-113.

17. K.V. Avramov, M.V. Chernobryvko, O. Kazachenko, T.J. Batutina. Dynamic instability of parabolic shells in supersonic gas stream. Meccanica, 2016, Vol. 51, No.4, p. 939-950.

18. K.V. Avramov. Bifurcation behavior of steady vibrations of cantilever plates with geometrical nonlinearities interacting with three-dimensional inviscid potential flow. Journal of Vibration and Control 2016, Vol. 22(5), 1198- 1216.

19. Avramov K.V., Filipkovsky S., Pirog V.A., Tonkonogenko A.M., Klimenko D.V. Nonlinear Longitudinal Oscillations of Fuel in Space Rockets Pipelines with Dampers. Acta Astronautica 120 (2016), p. 20-29.

20. M.V. Chernobryvko, K. V. Avramov. Natural vibrations of parabolic shells. Journal of Mathematical Sciences 206(3), 2015, p. 1-10.

21. K. V. Avramov, N. Shulzhenko, A. Borisuk, C.Pierre. Influence of periodic excitation on self-sustained vibrations of asymmetrical one disk rotors in arbitrary length journals bearings. International Journal of Nonlinear Mechanics Vol. 77, p. 274-280, 2015.

22. M.V. Chernobryvko, K.V. Avramov, V.N. Romanenko, T.J. Batutins, U.S. Suleimenov. Dynamic instability of ring-stiffened conical thin-walled rocket fairing in supersonic gas stream. // Journal of Mechanical Engineering Science. 2016. Vol. 230(1), P. 55- 68.

23. K.V. Avramov, E.A. Strel'nikova. Saturation of almost periodic and chaotic aeroelastic oscillations of plates under a resonant multimode force. International Applied Mechanics, Vol. 51, No.3, 2015, p.342-349.

24. M.V. Chernobryvko, K.V. Avramov, V.N. Romanenko, T.J. Batutina, A.M. Tonkonogenko, Free linear vibrations of parabolic shells. Meccanica, 2014 Vol. 49, No.8, 2014, p.14-21

25. B. Uspensky, K. Avramov. Nonlinear modes of essential nonlinear piecewise linear systems under the action of periodic excitation. Nonlinear Dynamics (2014) V.76. p. 1151-1156.

26. K. V. Avramov, Yu.V. Mihlin. Review of applications of nonlinear normal modes for vibrating mechanical systems, Applied Mechanical Reviewer. 65 (2), 2013 (20 pages) doi:10.1115/1.4023533

ADDITIONAL INFORMATION:

Language Proficiency:
English, Ukraine

IT Skills:
ANSYS, Maple