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General Fields of work:

- Stability of structures (stiffened shells, plates, thin-walled bars); the nonlinear theory of coupled instability.
- Structural optimization (minimum weight design of stiffened shells, plates, thin-walled bars).
- Numerical methods of nonlinear programming (unconstrained and constrained minimization).
- Dynamics of Structures (shells, shear deformable beams and plates).
- Nonlinear oscillations of multi-degree of freedom systems (asymptotical methods).
- General problems of methodology of mechanics.

Teaching:

Theoretical Mechanics
 Strength of Materials
 Shell and Plate Theory
 Stability of Elastic Systems
 Theory of Oscillations
 Thin-Walled Structures
 Asymptotical Methods in Nonlinear Mechanics
 Calculus and Differential Equations
 Complex Analysis
 Probability Theory

Academic Training

1962 MS Engineer (mechanics). Dniepropetrovsk State University, the mechanical-mathematical faculty.
 1967 Ph.D. degree for research in Civil Engineering. Title of the Thesis: "Investigation of the overall instability of cylindrical shells under external pressure".
 1989 D. Sci.. degree for research in Mechanics of Deformable Solids.. Title of the Thesis: "Nonlinear theory of stability of stiffened plates and shells with taking into account the interaction of buckling modes" (the Leningrad Polytechnical Institute).

Biography and Career:

Born 2.01.1940 in Mogiliov (Belorussia).
 1962 - 1966 Engineer - researcher of the Design department of the Rybinsk aircraft plant
 1966 - 1974 Senior researcher of the Dniepropetrovsk Division of Institute of Mechanics
 (Ukrainian Academy of Science)
 1974 - 1989 Associate professor of the High Mathematics Department of the
 Ukrainian State Chemical Engineering University (Dniepropetrovsk)
 1990 - 2000 Professor of the Theoretical Mechanics and Strength of Materials
 Department of the Ukraine State Chemical Engineering University
 2001- Professor of the Computational Mechanics and Strength of Structures
 Department of the Dniepropetrovsk National University, Ukraine

Member of EUROMECH and GAMM.

PUBLICATIONS: About 200 publications, including 2 monographs, on mechanics and applied mathematics.

Monographs:

1. Stability and Optimal Design of Stiffened Shells. Kiev, Vyshcha Schola, 1979 (in Russian).-152 p.

2. The Mechanics of Nonlinear Systems with Internal Resonances. Imperial College Press, London, 2005, 260 p. (co-author Manevich L.I).

Some papers relating to stability of shells and thin-walled structures:

1. An experimental investigation of buckling of longitudinally stiffened cylindrical shells under axial compression. In.: *"Rashchiot prostranstvennykh konstrukcij"* (*"Design of Spatial Structures"*), v. 14, Moscow, Stroyizdat, 1971 (in Russian, co-authors Demeshko M. F., Krasovsky V.L., Kucherenko V. M.).
2. The influence of internal pressure on buckling of eccentrically stiffened cylindrical shells under axial compression. In.: *"Rashchiot prostranstvennykh konstrukcij"* (*"Design of Spatial Structures"*), v. 15, Moscow, Stroyizdat, 1973 (in Russian, co-authors Krasovsky V.L., Kucherenko V. M.).
3. Coupled modes of buckling of a longitudinally stiffened cylindrical shell. In: *"Hydroaeromechanics and Theory of elasticity"*, v. 22. Dnepropetrovsk, DGU, 1977 (in Russian).
4. The mode interaction in a compressed stiffened panel. *"Stroitel'naya mekhanika i rashchiot sooruzhenij"* (*Civil Engineering and Design of Buildings*), 1981, 5 (in Russian).
5. **On the Theory of Coupled Loss of Stability in Stiffened Thin-Walled Structures. *J. Applied Maths Mechs (PMM USSR)*, Vol. 46, No.2, pp. 261 –267, Pergamon Press Ltd. 1983).**
6. **Loss of Stability of Compressed Longitudinally Stiffened Cylindrical Shells at Finite Displacements with Account of Ribs-Plates Local Buckling. *Izv. AN USSR, Mekhan. Tverdogo Tela*, 1983, No. 2, pp. 136-145).**
7. Buckling of plates and shells with T-profile ribs. *"Stroitel'naya mekhanika i rashchiot sooruzhenij"* (*Civil Engineering and Design of Buildings*), 1985, _2 (in Russian).
8. Coupled Stability Loss of a Compressed Stiffened Panel. *Izv. AN SSSR. Mekhanika Tverdogo Tela*. Vol. 23, No. 5, pp.152-159, 1988, Allerton Press, Inc.
9. The nonlinear problem of coupled buckling of compressed thin-walled ribs with rectangular hollow cross-section. *Izvestiya vuzov. "Stroitelstvo"* (*Civil Engineering*), Novosibirsk, 1994, _5-6 (in Russian, co-author S.V. Raksha).
10. Coupled instability of rectangular cross-section thin-walled columns at eccentric compression.- *Izvestiya vuzov. "Stroitelstvo"* (*Civil Engineering*), Novosibirsk, 1995, v.1, p. 21-27 (in Russian, co-author Raksha S.V.).
11. **Coupled instability of cylindrical shells stiffened with thin ribs. *Thin-Walled Structures. Proc. of the Third Internat. Confer.*, Elsevier, 2001, p. 683-691.**
12. Coupled instability of thin-walled bars (ideas, methods and some results of investigations). *Theoretical Foundations of Civil Engineering. Polish-Ukrainian Transactions*, vol. X, part II, Warsaw, June 2002, ñ. 764-774 (in Russian, co-author - Raksha S.V.).
13. Asymptotic solution of the buckling problem for orthotropic cylindrical shells under torsion. In: *Theoretical Foundations of Civil Engineering – XV*, Warsaw 2007, pp. 463-472.
14. Buckling of structural members with hardening and design codes. *Thin-Walled Structures* (Elsevier, London), v. 45, No. 10-11, 2007, pp. 810-815.
15. Buckling of orthotropic cylindrical shells under torsion. Part 1. Theory. -Int. J. "Strength of Materials" (Kiev), 2008, _3, _ . 17–28 (in Russian, co-author –Prokopalo Ye. F.).
16. Buckling of orthotropic cylindrical shells under torsion. Part 2. Experiment. Int. J. "Strength of Materials" (Kiev), 2008, _4, _ . 69 - 78 (in Russian, co-author –Prokopalo Ye. F.).

MAIN RESULTS in the field of structures stability

In experimental investigations of compressed cylindrical shells, stiffened with thin-walled ribs, carried out in 1969-1971, there has been revealed the crucial role of nonlinear interaction of overall and local modes in the

buckling of stiffened shells. A nonlinear theory of coupled buckling of stiffened plates and shells has been elaborated and experimentally verified (1972-1989), which takes into account the interaction of all buckling modes, including “rib buckling” modes. These results have been presented in monograph [1], in Dr. Sci. Thesis “Nonlinear theory of stability of stiffened plates and shells with taking into account the interaction of buckling modes” (Leningrad, LPI, 1989) and numerous papers partially listed above.

Selected papers on structural optimization

1. Optimization of equally-stiffened cylindrical shells under axial compression. In.: "Theory of Shells and Plates", Moscow, Nauka, 1971, pp. 178-184 (in Russian).
2. To the weight optimization of structurally-orthotropic cylindrical shells. In.: "Theory of Shells and Plates", Proc. of I_ All-Union conference on the theory of shells and plates. Leningrad, Sudostrojenie, 1975 (in Russian, co-author Zajdenberg A.I.).
3. Weight optimization of a longitudinally compressed panel with T-shape stiffeners. *Sov. Appl. Mech.* (Transl. from *Prikladnaya Mekhanika*), vol. 26, 1990, 2, pp.82-86, Plenum Publ. Corp., 1990.
4. Optimization of compressed longitudinally stiffened cylindrical shell on the base of the linear and nonlinear theory of stability. “*Stroitel'naya mekhanika i rashchiot sooruzhenij*” (*Civil Engineering and Design of Buildings*), 1990, _3 (in Russian).
5. Influence of geometrical constraints associated with manufacturing upon optimal parameters of stiffened plates and shells under compression. WCSMO-2 Structural and Multidisciplinary optimization. *Proceedings of the Second World Congress (Zakopane, Poland, May 26-30 1997)*. Ed. W. Gutkowski, Z. Mroz. V.2., IFTR, Warsaw, Poland.1997.- P. 847- 852.
6. Two-criteria optimization of thin-walled beams-columns under compression and bending. Thin-Walled Structures. Proc. of the Third Internat. Confer., Elsevier, 2001, p.575-583 (co-author – S.V. Raksha).
7. The optimum design of compressed thin-walled profiles with account of nonlinear interaction of buckling modes. “*Stroitelstvo i Arkhitektura*” (*Civil Engineering and Architecture*), Novosibirsk, _6, 2001.-_15-21 (in Russian, co-author S.V. Raksha).
8. The optimum design of thin-walled structures with account of nonlinear interaction of buckling modes. In: «*Theoretical Foundations of Civil Engineering-XI*». Ed. W. Szczesniak, OW PW, Warsaw 2003, pp. 167-176 (in Russian, co-author S.V. Raksha).
9. Two-criteria optimization of H-section bars under bending and compression. Thin-Walled Structures (Elsevier, London), v. 45, No. 10-11, 2007, pp. 898-901, (co-author S.V. Raksha).

MAIN RESULTS in the field of optimization of shells and thin-walled structures

There have been obtained solutions of minimum-weight problems for stiffened plates, shells and thin-walled bars-beams, based on the linear theory of stability and the nonlinear theory of interactive buckling. A new approach to the multi-criteria optimization of structures subjected to different systems of combined loading has been proposed.

Selected papers on dynamics of shells and thin-walled structures

1. Interaction of Conjugate Modes at Non-Linear Flexural Vibrations of a Circular Ring. *J. Appl. Maths Mechs*, v. 58, 1994, _6, pp. 257-266.
2. Internal Resonances at Nonlinear Free Flexural and Flexural-Torsional Oscillations of Thin-Walled Beams. *Proc. of the 2nd European Nonlinear Oscillations Conference*. V. 3. (Praque, September 1996). Praque, 1996.

3. **Nonlinear free flexural oscillations of a cylindrical shell with account of interaction of conjugate modes. Izvestija of Russian Acad. of Science, Mekhanika Tverdogo tela, 1997, 3, p. 169-175 (co-author Ladygina E. V.).**
4. Free oscillations in conservative and dissipative symmetric cubic two-degree-of freedom systems with closed natural frequencies. *Meccanica, Int. J. of the Italian Assoc. of Theor. and Appl. Mech.*, 2003, vol. 38, No. 3, Kluwer Acad. Publ., p.335-348 (co-author Manevich L.I.).
5. Interaction of subharmonic and 1:1 internal resonances in 2dof cubic symmetric systems. Proc. of the Fifth EUROMECH Nonlinear Dynamics Conference, 7-12 August 2005, Ed. D.H. van Campen, M.D. Lazurko, W.P.J.M. van der Oever (Eindhoven University of Technology, the Netherlands), 2005, 8 p..

MAIN RESULTS in field of shells dynamics

A general investigation of the internal resonances in nonlinear systems, having close natural frequencies, has been carried out. This analysis has been applied to investigation of nonlinear oscillations in shells and thin-walled beams with account of interaction of different oscillation modes. The main results have been presented in the monograph “The Mechanics of Nonlinear Systems with Internal Resonances”, ICP, London, 2005, and in the papers listed above.