Simulation of the dynamic stability of cylindrical shell under the action of external overpressure

© V.M. Dubrovin, T.A. Butina

Bauman Moscow State Technical University, Moscow, 105005, Russia

The suggested method is to calculate dynamic stability of cylindrical shells under loading of external excessive pressure, distributed over shell surface. As an example, we consider the case where the pressure varies in accordance with the linear law

Keywords: cylindrical shell, прогиб, the equilibrium position, chart, the dynamic factor.

REFERENCES

- [1] Volmir A.S. *Ustoichivost' deformiruemykh system* [Stability of deformable systems]. Moscow, Nauka Publ., 1967, 987 p.
- [2] Belonosov S.M. *Matematicheskoe modelirovanie ravnovesnykh sostoyaniy uprugikh tonkikh obolochek* [Mathematical modeling of the equilibrium states of thin elastic shells]. Moscow, Nauka Publ., 1993, 158 p.
- [3] Agamirov V.L. *Dinamicheskie zadachi nelineinoy teorii obolochek* [Dynamic problems of nonlinear shell theory]. Moscow, Nauka Publ., 1990, 269 p.
- [4] Rabotnov Yu.N. *Problemy mekhaniki deformiruemogo tela* [Problems of solid mechanics]. Moscow, Nauka Publ., 1991, 194 p.
- [5] Zhilin P.A. Aktualnye problemy mekhaniki. Sbornik statey [Actual Problems in Mechanics. Coll. papers]. St.-Petersburg, Institute of Problems of Mechanical Engineering RAS, 2006, 306 p.
- [6] Vlasov V.Z. Izbrannye Trudy. Obschaya teoriya obolochek [Selected works. General theory of shells]. Moscow, Publishing House of the USSR Academy of Sciences, 1962, vol. 1, 528 p.
- [7] Zhilin P.A. *Osnovy teorii obolochek* [Fundamentals of the theory of shells]. St.-Petersburg, Publishing house of the State Politechnical University, 2006, 166 p.
- [8] Dimitrienko Yu.I. Mekhanika sploshnoy sredy. Tom 2. Universalnye zakony mekhaniki i elektrodinamiki sploshnoy sredy [Continuum Mechanics. Vol. 2. Universal laws of mechanics and electrodynamics of continuous media]. Moscow, BMSTU Publ., 2011, 560 p.
- [9] Vorovich I.I. Matematicheskie problemy nelineinoy teorii pologikh obolochek [Mathematical problems of the nonlinear theory of of gently sloping shells]. Moscow, Nauka Publ., 1989, 373 p.
- [10] Kubenko V.D., Kovalchuk P.S., Podchasov N.P. Nelineinye kolebaniya tsilindricheskikh obolochek [Nonlinear vibrations of cylindrical shells]. Kiev, Vyscha shkola, 1989, 207 p.
- [11] Narasimhan K.Y., Hoff N.J. Snapping of Imperfect Thin-Walled Circular Cylindrical Shells of Finite Length Trans. ASME, ser E, 1971, vol. 38, no. 1, pp. 160–172.

Dubrovin V.M. (b. 1934) graduated from the Faculty of Mathematics and Mechanics of the Saratov State University in 1958. Ph.D., Assoc. Pro-fessor of the Computational Mathematics and Mathematical Physics and of the Higher Mathematics Departments of Bauman Moscow State Tech-nical University. Research interests: dynamics, strength and stability of deformable systems; creep of structural materials. He is the author of five inventions. e-mail: dubrovinvm1934@ mail.ru

Butina T.A. (b. 1950) graduated from the Faculty of Management and Applied Mathematics of the Moscow Institute of Physics and Technology in 1974. Ph.D., Assoc. Professor of the Computational Mathematics and Mathematical Physics Department of Bauman Moscow State Technical University. She specializes in the field of strength and stability of deformable systems. e-mail: butinata@mail.ru