629.784:621.64:532.542

. .[1], . .[2] . .[3]

«   —   »

                                                                                                 ,

. .   -   , 15, 49005,   ,   ; e-mail
e-mail: [1]odnikolayev@gmail.com; [2]ibloha@i.ua; [3]khoryak@i.ua

-   «
(   ) –   -   (   )»   -
                                                            ,   -
                                                (   )
                                    ,   -
                                            (POGO).

            «   —   »
                        ,
                                                                                             -
                        (   )
                    .   «   —
        »   ,
POGO-   —
                                    .
                        POGO-   165
                                        130 .   -
«   —   ».   ,
    ,
15,9   .,   II -   .
                        -
                                                        (,   -
)
                ,   .

                        :   ,
        ,   ,   ,   -
                    ,   ,   -
        ,   .

1. *Natanson M. S*. Longitudinal self-oscillation of liquid rocket.   : Mechanical engineering, 1977. 208 p.
2. *Oppenheim B. W., Rubin S.* Advanced Pogo Stability Analysis for Liquid Rockets. Journal of Spacecraft and Rockets. 1993. Vol. 30. No. 3. P. 360 – 383.
3. *Qingwei Wang, Shujun Tan, Zhigang Wu, Yunfei Yang, Ziwen Yu.* Improved modelling method of Pogo analysis and simulation. Acta Astronautica1. 07(2015). P. 262–273. URL: http://dx.doi.org/10.1016/j.actaastro.2014.11.034.
4. *Swanson L. A., Giel T. V.* Design Analysis of the Ares I POGO Accumulator. AIAA 2009-4950. 45th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit (2–5 August 2009, Denver, Colorado). URL: http://dx.doi.org/10.2514/6.2009-4950.
5. *Zhihua Zhao, Gexue Ren, Ziwen Yu, Bo Tang, Qingsong Zhang.* Parameter Study on Pogo Stability of Liquid Rockets. Journal of Spacecraft and Rockets. 2011. Vol. 48. No. 3. P. 537 – 541. (doi: 10.2514/1.51877).
6. *Junbeom Kim, Sang Joon Shin, Jongho Park, and Youdan Kim.* Structural Modeling Reflected Nonlinearity for Longitudinal Dynamic Instability (POGO) Analysis of Liquid Propellant Launch Vehicles in Preliminary Design Phase. AIAA SPACE 2015 Conference and Exposition, AIAA SPACE Forum, (AIAA 2015-4594). URL: http://dx.doi.org/10.2514/6.2015-4594
7. *Dotson K. W., Phuong Than.* Procedure for Mission-Specific Pogo Stability Analyses and Risk Assessments. Spacecraft and Launch Vehicle Dynamic Environments Workshop Proceeding. (22 June 2005, El Segundo, CA). The Aerospace Corporation, 19 p.
8. *Pilipenko V. V.* Cavitational self-oscillation. Kiev: Naukova Dumka, 1989. 316 p. (in Russian).

9. *Pilipenko V. V., Zadonzev A. P., Grigoriev A. P., Belezkiy A. S.* Estimation of amplitudes of liquid launch vehicles longitudinal oscillations // Mechanics in Aviation and Astronautics.   ., 1995. P. 27–34 (in Russian).

10. *Belezkiy A. S.* Estimation of amplitudes of liquid launch vehicles longitudinal oscillations by method of harmonic linearization. Technical mechanics. 1993. Issue.2. P.58–63. (in Russian).

11. *Pilipenko V. V., Dovgotko N. I., Dolgopolov S. I., Nikolayev O. D., Serenko V. A., Khoriak N. V.* Theoretical determination of amplitudes of liquid launch vehicle longitudinal oscillations. Space science and technology. 1999. Vol. 5.   1. P. 90–96. (in Russian).

12. *Pilipenko V. V., Dovgotko N. I., Pilipenko O. V., Nikolayev O. D., Pirog V. A., Dolgopolov S. I., Hodorenko V. F., Khoriak N.V., Bashliy I. D.* Theoretical prediction of spacecraft longitudinal vibrations of Cyclone-4 liquid launch vehicle. Technical mechanics. 2011.   4. P. 30–36. (in Russian).

13. *Khoriak N. V., Nikolayev O. D.* Mathematical modeling of interaction of longitudinal oscillations of liquid launch vehicle structure and dynamic processes in the propulsion system. Technical mechanics. 2010.   3. P. 27–37. (in Russian).

14. *Chigarev A. V., Kravchuk A. S., Smaluk A. F.* ANSYS for engineers. Handbook.   : Mechanical engineering, 2004. 512 p. (in Russian).

15. *Bashliy I. D., Nikolayev O. D.* Mathematical modeling of spatial oscillations of shell structures with liquid using modern computer-aided design and analysis tools. Technical mechanics. 2013.   2 P. 12–22.

16. *Nikolayev O. D., Bashliy I. D.* Mathematical modeling of spatial oscillations of liquid in a cylindrical tank with tank structure longitudinal vibrations. Technical mechanics. 2012.   2. P. 14-22. (in Russian).

17. *Nikolayev O. D., Khoriak N. V., Serenko V. A., Klimenko D. V., Hodorenko V. F., Bashliy I. D.* Mathematical modeling of longitudinal oscillations of liquid launch vehicle structure taking into account of dissipative forces. Technical mechanics. 2016.   2. P. 16–31. (in Russian).

18. *Jarvinen, W & Kennoy, J & A. Kiefling, L & Odum, R & G. Papadopoulos, J & S. Ryan, R.* (1970). A study of Saturn AS-502 coupling longitudinal structural vibration and lateral bending response during boost. Journal of Spacecraft and Rockets. 7. 10.2514/3.29884.

15.05.2018,
29.05.2018

18