
Linguistic modeling analysis of an emergency risk on board a manned spacecraft on the example of the system of ensuring the temperature regime in the Russian segment of the International Space Station

© A.V. Donskov

S.P. Korolev Rocket and Space Public Corporation Energia, Korolev town,
Moscow region, 141070, Russia

When controlling a manned spacecraft flight the risks of emergency situations must be constantly analyzed, taking into account the current state of the spacecraft as a whole, as well as the individual system maturity. As specialists often operate with the terms and describe the state of the manned spacecraft systems with linguistic variables, the article considers the possibility of an emergency on the example of the system of ensuring the temperature regime in the Russian segment of the International Space Station by linguistic modeling. This method allows for a detailed evaluation of the current situation and assessment the possible risks. It simplifies the process of making decisions on the choice of optimal emergency parry strategy.

Keywords: flight control, manned spacecraft, emergency, risk assessment, linguistic modeling.

REFERENCES

- [1] Kravets V.G., Lubinskiy V.E. *Osnovy upravleniya kosmicheskimi poletami* [Basics of Space Flight Control]. Moscow, Mashinostroenie Publ., 1983, 256 p.
- [2] Solovyev V.A., Lysenko L.N., Lubinskiy V.E. *Upravlenie kosmicheskimi poletami. T. 1, 2* [Space Flight Control. Vol. 1, 2]. Moscow, BMSTU Publ., 2009, 426 p.
- [3] Porfiryev B.N. *Nauka i tekhnika – Science and Technology*, 1986, no. 4, p. 14.
- [4] Antonov G., Kurochkin V. Nekotorye teoreticheskie aspekty avariynosti s tochki zreniya praktiki [Some Theoretical Aspects of the Accident Rate in Terms of Practice]. *Morskoy sbornik* [Admiralty Collection], 1994, no. 6.
- [5] Gvishiani S.V., Emelyanova S.V., eds. *Mnogokriterialnye zadachi prinyatiya resheniy* [Multicriteria Decision Making Problems]. Moscow, Mashinostroenie Publ., 1978, 192 p.
- [6] Borisov A.N., Alekseev A.V., Krumberg O.A., et al. *Modeli prinyatiya resheniy na ocnove lingvisticheskoy peremennoy* [Models of Decision Making on the Basis of Linguistic Variable]. Riga, Zinatne Publ., 1982, 256 p.
- [7] Orlovskiy S.A. *Problemy prinyatiya resheniy pri nechetkoy iskhodnoy informatsii* [Decision-Making Problems with Fuzzy Initial Information]. Moscow, Nauka Publ., 1981, 206 p.
- [8] Zadeh L. *Journal: Information Sciences, ISCI*, 1975, vol. 8, no. 3, pp. 199–249. [In Russian: Zade L. Ponyatie lingvisticheskoy peremennoy i ee primenenie k prinyatiyu priblizhennykh resheniy. Moscow, Mir Publ., 1976, 167 p.]
- [9] Aliev R.A., Tserkovnyy A.E., Mamedova G.A. *Upravlenie proizvodstvom pri nechetkoy iskhodnoy informatsii* [Production Management under the Fuzzy Initial Information]. Moscow, Energoatomizdat Publ., 1991, 239 p.
- [10] Donskov A.V. *Inzhenernyy vestnik – Engineering Bulletin*, 2015, no. 6. Available at: <http://technomag.edu.ru/doc/479653.html>

Donskov A.V. (b. 1986) graduated from Bauman State Technical University in 2009. Engineer, S.P. Korolev Rocket and Space Public Corporation Energia. e-mail: aleksej_ne@mail.ru
