

---

# A system of multi-level impulse correction

© Yu.V. Velikiy, A.N. Klishin

Bauman Moscow State Technical University, Moscow, 105005, Russia

*Current political situation and counter-terrorist measures lead to the majority of warfare being carried out locally, and, as a rule, in densely populated areas. This trend formed the grounds for developing new artillery and mortar systems and updating older ones with guided munitions. The necessity of employing guided munitions, in its turn, is due to high mobility of contemporary weapon systems and improvements in their protection. Given that artillery and mortar munitions are small in size and have to be well-suited for mass production, be simple in design and boast low production costs, their guidance system should be cheap, simple, reliable and at the same time able to ensure high efficiency of target defeat. The article deals with the problem of defeating a target with a given accuracy in the case of insufficient prior information on its actual position. It must be noted that an impulse correction system features a fixed value of the correction push, which leads to the issues of “under-“ or “over-correction”. We suggest introducing a multi-level correction system to solve this non-trivial problem, employing correction engines of varied thrust.*

**Keywords:** *guided munition, impulse correction system, multi-impulse correction, correction engines.*

## REFERENCES

- [1] Kazakovtsev V.P., Zhileykin V.D. *Obrabotka strelb: Metodicheskie ukazaniya k laboratornym rabotam* [Processing shooting data: laboratory work guidelines]. Moscow, BMSTU Publ., 2009
  - [2] Benevolskiy S.B., Burlov V.V., Kazakovtsev V.P. *Ballistika: Uchebnik dlya kursantov i slushateley GRAU* [Ballistics: a textbook for students and cadets of the Main Missile and Artillery Directorate]. Lysenko L.H., ed. Penza, Penza Artillery Engineering Institute Publ., 2005.
  - [3] Platonova A.V., Klishin A.N., Ilyukhin S.N. *Osnovy adaptivnogo upravleniya vysokotochnymi letatelnyimi apparatami* [Basic aspects of adaptive control of precision-guided airborne devices]. *Materialy XXXIX akademicheskikh chteniy po kosmonavtike* [Proc. of the 39<sup>th</sup> Academic Lectures on Cosmonautics]. Moscow, BMSTU Publ., 2015, pp. 333–334.
  - [4] Lysenko L.N. *Navedenie i navigatsiya ballisticheskikh raket* [Guidance and navigation for ballistic missiles]. Moscow, BMSTU Publ., 2007, 672 p.
  - [5] Lebedev A.A., Karabanov V.A. *Dinamika sistem upravleniya bespilotnymi letatelnyimi apparatami* [Guidance system dynamics for unmanned aircraft]. Moscow, Mashinostroenie Publ., 1965.
  - [6] Dmitrievskiy A.A., Lysenko L.N., Ivanov N.M. et al. *Ballistika i navigatsiya raket* [Ballistics and navigation for rockets]. Moscow, Mashinostroenie Publ., 1985.
  - [7] Volkov E.A. *Chislennyye metody: ucheb.posobie* [Numerical techniques: a workbook]. 5th edition. Saint Petersburg, Lan Publ., 2008.
  - [8] Sikharulidze Yu.G. *Ballistika letatelnykh apparatov* [Aircraft ballistics]. Moscow, Nauka Publ., 1982.
-

- 
- [9] Shvyrkina O.S. *Molodezhnyy nauchno-tekhnicheskiy vestnik MGTU im. N.E. Baumana – Youth Science and Technology Herald of the Bauman MSTU*, 2015, no. 4, p. 3.
- [10] Ilyukhin S.N. *Molodezhnyy nauchno-tekhnicheskiy vestnik MGTU im. N.E. Baumana – Youth Science and Technology Herald of the Bauman MSTU*, 2013, no. 8, p. 3.

**Velikiy Yu.V.**, student, Department of Dynamics and Flight Control of Rockets and Spacecraft, Bauman Moscow State Technical University. Author of a scientific publication in the field of ballistics and aircraft motion guidance. Specialises in developing guidance systems for small-sized aircraft. e-mail: velikiyuv@yandex.ru

**Klishin A.N.**, Cand. Sci. (Eng.), Assoc. Professor, Department of Dynamics and Flight Control of Rockets and Spacecraft, Bauman Moscow State Technical University. Author of over 150 scientific and popular science publications in the fields of ballistics, flight dynamics, aircraft motion guidance and armament history. Specialises in developing missile systems and history of small arms and side arms.

---