

DOI: <https://doi.org/10.15407/technd2018.01.037>

AVERAGING OF PUSH-PULL DC CONVERTER MODEL

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	No 1, 2018 (January/February)
Pages	37 – 46

Author

Yu.V. Rudenko

Institute of Electrodynamics National Academy of Sciences of Ukraine,
pr. Peremohy, 56, Kyiv, 03057, Ukraine,
e-mail: rudenko@ied.org.ua

Abstract

The modified method of averaging of pulse dc converter model with multi-stage piecewise-linear type of variable states functions of current is developed. Such character of variable states functions is typical for the push-pull converters with various configurations. The method is based on determination of the averaged system on all intervals of structure permanence relatively of minimum and sufficient number of independent variables – the increments of variable states

and their average values on intervals, interval durations. Analysis is conducted on the example of asymmetrical inverter with magnetically coupled chokes. The calculations of inverter characteristics are conducted by means of the developed modified method and simulation technique. Coincidence of calculation results with an error no more than 5,6 % proves the adequacy of developed modified method of averaging. References 9, figures 4, table 1.

Key words: state-space averaging method, pulse dc converter.

Received: 14.06.2017

Accepted: 27.10.2017

Published: 29.01.2018

References

1. Korn G., Korn T. Mathematical Handbook for Scientists and Engineers. Moskva: Nauka, 1984. 832 p. (Rus)
2. Meleshin V.I. Transistor conversion technique. Moskva: Tekhnosfera, 2006. 632 p. (Rus)
3. Martynov V.V. Power supplies for electron-beam and plasmous technological equipment. *Pratsi Instytutu Elektrodynamiky Natsionalnoi Akademii Nauk Ukrainy*. 2004. No 3(9). Pp. 43–49. (Rus)
4. Martynov V.V., Rudenko Yu.V., Rudenko T.V. Power supply systems for powerful technologies. *Elektronika i Sviaz*. 2013. No 3(74). Pp. 14–18. (Rus)
5. Rudenko Yu.V. Mode of averaging of pulse dc converter model. *Tekhnichna Elektrodynamika*. 2017. No 3. Pp. 42–48. (Rus)
6. Rusin Yu.S. Transformers of sonic and ultra sonic frequency. Leningrad: Energiia, 1973.

152 p. (Rus)

7. Komarov M.S., Martynov V.V. Power supply unit of electron-beam installation. Patent of Ukraine No 29547. 2000. (Ukr)

8. Marian K. Kazimierczuk. Pulse-Width Modulated DC-DC Power Converters. John Wiley&Sons, Ltd, 2016. 960 p.

9. Sanders S., Noworolski J., Lui X., Verghese G. Generalized averaging method for power conversion circuits. *IEEE Trans. Power Electronics*. 1991. Vol. 2. Issue 2. Pp. 251 – 259. <https://doi.org/10.1109/63.76811>

[PDF](#)