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MODE OF AVERAGING OF PULSE DC CONVERTER MODEL

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Abstract

The mode of model averaging is proposed which allows to analyze the processes at pulse dc converters from general positions. Obtained model contains both parameters of average variable states, their ripples during period of steady-state regime and parameters of time intervals of converter state. The range of ratio between time constant of converter circuit and its operation period is grounded in which the error of model calculations is not more than 3%. The calculations using proposed mode and method of schematic simulation are fulfilled by the example of simplest step-down converter that confirms the high precision of results coincidence at mentioned range of parameters. References 9, figures 2, table 1.

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

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References

1. Denysiuk S.P., Melnychuk G.V. Forming of equation system of variable states for processes calculation at the electric circuits with cyclic variable modes. *Pratsi Instytutu Elektrodynamiky Natsionalnoi Akademii Nauk Ukrainy.* 2005. No 3(12). Pp.132–137 (Ukr)
2. Korn G., Korn T. Mathematical Handbook for Scientists and Engineers. Moskva: Nauka, 1984. 832 p. (Rus)
3. *Meleshin V.I.* Transistor conversion technique. Moskva: Tekhnosfera, 2006. 632 p. (Rus)
4. Rozanov Yu.K., Riabchytsky M.V., Kvasnuk A.A. Power electronics. Moskva: Izdatelskii dom MEI, 2009. 632 p. (Rus)
5. Rudenko V.S., Zhuikov V.Ya., Korotyeyev I.Ye. Calculation of conversion technique systems. Kyiv:Tekhnika, 1980. 135 p. (Rus)
6. Rudenko V.S., Senko V.I., Chizhenko I.M. Conversion technique. Kyiv:Vyshcha shkola, 1983. 431 p. (Rus)
7. Rudenko Yu.V. Analysis of processes at flyback converter taking into account the transformer faultiness. *Pratsi Instytutu Elektrodynamiky Natsionalnoi Akademii Nauk Ukrainy*. 2011. No 30. Pp. 108–116. (Rus)
8. Marian K. Kazimierczuk. Pulse-Width Modulated DC-DC Power Converters. John Wiley&Sons, Ltd, UK, 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. No 2. Pp. 251–259. DOI: https://doi.org/10.1109/63.76811

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