DOI: <https://doi.org/10.15407/techned2018.06 . 030>

CONTROL SYSTEM OF THE FILTER-COMPENSATING DEVICE WITH THE SECOND-ORDER FUZZY REGULATOR

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	No 6, 2018 (November/December)
Pages	30 – 33

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Abstract

In this article the expediency of using the fuzzy controller, as part of an additional control loop of the compensator control system in terms of the level of commutation overvoltages and amplitudes of the higher harmonics of the supply network current, is shown. The use of fuzzy controller makes it possible, in the process of reactive power compensation, to reduce the

generation of higher harmonics of the current to the network, without exceeding the established level of switching overvoltages. The principles of control of the filter compensating device for the powerful sounding pulses generator using the second order fuzzy regulator are considered. The use of a fuzzy second-order regulator will enable the controlled parameters to be adjusted with the given accuracy. References 8, figures 5, table 1.

Key words: multi-functional compensators, control system, fuzzy logic controller.

Received: 05.03.2018

Accepted: 30.05.2018

Published: 23.10.2018

References

1. Asiminoaei L., Lascu C., Blaabjerg F., Boldea I. Performance Improvement of Shunt Active Power Filter With Dual Parallel Topology. *IEEE Transactions on Power Electronics*. 2007. Vol. 22. No 1. Pp. 247-259.
2. Dixon J., del Valle Y., Orchard M., Ortúzar M., L. Morán L. Maffrand C. A Full Compensating System for General Loads, Based on a Combination of Thyristor Binary Compensator and a PWM-IGBT Active Power Filter. *IEEE Trans. Industrial Electronics*. 2003. Vol. 50. No 5. Pp. 982-989.
3. Domnin I.F., Levon E.A., Varvyanskaya V.V. Fuzzy logic based control system of converter for powerful sounding pulses generator. *Bulletin of NTU KhPI*. 2014. No 47. Pp. 22–27.
4. Domnin I.F., Kaida E.A. Synthesis of the second-order fuzzy regulator for the control system of the filter-compensating device. *Bulletin of NTU KhPI. Series: Radiophysics and ionosphere*. 2017. No 42 (948). Pp. 17–22. (Rus)
5. Kim S., Enjeti P.N. A New Hybrid Active Power Filter (APF) Topology. *IEEE Transactions on Power Electronics* .

2002. Vol. 17. No 1. Pp. 48-54.

6. Kwak S., Kim T. An Integrated Current Source Inverter With Reactive and Harmonic Power Compensators. *IEEE Transactions on Power Electronics*. 2009. Vol. 24. No 2. Pp. 348-357.

7. Levon O.O. Semiconductor dual two-channel regulated compensator of inactive components of the total power: Ph.Dr. tech. sci. diss.: 05.09.12. NTU KhPI. Kharkiv. 2015. 200 p. (Rus)

8. Soloviev K.A., Muravieva E.A. The reference model for a process control system based on a fuzzy controller of the second order. *Modern problems of science and education in technical high school* : sat. materials of II International scientific-practical conf. Sterlitamak. 2015. Pp. 61–66. (Rus)

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