DOI: <https://doi.org/10.15407/techned2018.04 . 047>

REACTIVE POWER COMPENSATION APPROACH WITH DYNAMIC MODE OF LOAD CURRENT

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	No 4, 2018 (July/August)
Pages	47 – 52

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Abstract

The actuality of the compensation of the residual reactive power that arises with the

non-stationary current of the power grid is shown. On the example of the computer power supply unit, the amount of residual reactive power is calculated by using a compensator with one period lag of the power grid voltage. In parallel with the general reactive power compensator, it is proposed to use an auxiliary one, which eliminates distortion of the grid current based on its predicting. It is shown that the use of the additional compensator allows reaching power factor value closed to one with a non-significant increase in the total installed capacity of the compensation system. The proposed compensation method is adapted to the presence of current pulsation of the general compensator. References 10, figures 9.

Key words: reactive power compensation, dynamical grid current, least squares method, power factor.

Received: 05.12.2017

Accepted: 16.01.2018

Published:

References

1. Ion Boldea and S.A. Nasar. Electric drives. CRC Press, 2006. 518 p.
2. Wong S.W., Valcarenghi L., Yen S.H., Campelo D.R., Yamashita S., Kazovsky L. Sleep mode for energy saving PONs: Advantages and drawbacks. *Globecom Workshops, IEEE*, 2009. P. 1-6. DOI: <http://doi.org/10.1109/GLOCOMW.2009.5360736>.
3. Bezhenar V., Mykolaets D., Mykytyuk V., Tereshchenko T. Multilevel inverter as var-compensator. *IEEE XXXIII International Scientific Conference Electronics and Nanotechnology* (ELNANO), Kyiv, 2013. Pp. 370-372. DOI: <http://doi.org/10.1109/ELNANO.2013.6552076>

4. Gyugyi Laszlo. Unified power-flow control concept for flexible AC transmission systems. *IEE proceedings C (generation, transmission and distribution)*. IET Digital Library, 1992. Pp. 323-331. DOI: <http://doi.org/10.1049/ip-c.1992.0048>
5. Kyselova A.G., Verbitskyi I.V., Kyselov G.D. Context-aware framework for energy management system. *2nd International Conference on Intelligent Energy and Power Systems (IEPS)*, Kyiv, 2016. P. 1-4. DOI: <http://doi.org/10.1109/IEPS.2016.7521890>
6. Zhuikov V., Verbytskyi I., Bondarenko O. Features of compensation of a reactive power at the transient mode. *Electric Power Networks (EPNet)*, 2016. P. 1-4. DOI: <http://doi.org/10.1109/EPNET.2016.7999362>
7. Tonkal V.E., Novoseltsev A.V., Denisyuk S.P. An energy balance in electrical circuits. Kyiv: Naukova Dumka, 1992. 312 p. (Rus.).
8. Marquardt Donald W. An algorithm for least-squares estimation of nonlinear parameters. *Journal of the society for Industrial and Applied Mathematics*. 1963. 11.2: 431-441. DOI: <https://doi.org/10.1137/0111030>
9. Fridman E., Fridman L., Shustin E. Steady modes in relay control systems with time delay and periodic disturbances. *Journal of Dynamic Systems, Measurement, and Control*. 2000. 122.4: 732-737. DOI: <http://doi.org/10.1115/1.1320443>
10. Tsympkin Y.Z. Relay automatic systems. Moskva: Nauka, 1974. 576 p. (Rus)

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