**DOI:** https://doi.org/10.15407/techned2016.04.017

# TRANSIENTS IN CIRCUITS WITH STOCHASTIC LOAD, WHICH CHARACTERIZED BY CONTINUOUS RANDOM VARIABLE


| | |
|---|---|
| Journal | Tekhnichna elektrodynamika |
| Publisher | Institute of Electrodynamics National Academy of Science of Ukraine |
| ISSN | 1607-7970 (print), 2218-1903 (online) |
| Issue | № 4, 2016 (July/August) |
| Pages | 17 – 19 |


**Authors**
**D.S. Ivashchenko[1], N.I. Suprunovska[2]***
[1] – Amazon.com, Inc., Terry Ave N, Seattle, Washington, United States,
e-mail: ivas-90@mail.ru
[2] – Institute of Electrodynamics NAS of Ukraine,
pr. Peremohy, 56, Kyiv-57, 03680, Ukraine,
e-mail: iednat1@igmail.com
* ORCID ID : http://orcid.org/0000-0001-7499-9142

## Abstract

*Modification of method of difference equations, allowing to analyze transients in circuits with stochastic load, which characterized by a continuous random variable has been implemented. A method for the transition from stochastic a difference equations with respect to the sought electrical characteristics of the circuit to a deterministic difference equation with respect to average of distribution of the sought characteristics has been described. As an example the transient in a circuit of the second order with the stochastic load having continuous uniform*

*distribution has been considered.* References 10, figure 1.

***Key words***: transients, discharge of capacitor, stochastic load, random process.

Received: 03.02.2016
Accepted: 24.03.2016
Published: 21.06.2016

**References**

1. Zhuikov V.Ya., Suchik V.E. Methods for analysis of circuits of rectifier converters with variable structure and any influencing sources by method of difference equations. Kiev: Kievskii Politekhnicheskii Institut, 1982. 47 p. (Rus)
2. Kashyap R.L., Rao A.R. Construction of dynamic stochastic models based on experimental data. Moskva: Nauka, 1983. 384 p. (Rus)
3. Lisyev V.P. Probability theory and the mathematical statistics. Moskva: MESI, 2006. 199 p. (Rus)
4. Suprunovska N.I., Ivashchenko D.S. Multilevel model of interdependent transients in circuits of electro-discharge installations with stochastic load. *Tekhnichna Elektrodynamika*. 2013. No 5. P. 5–13. (Rus)
5. *Tonkal V.E., Rudenko V.S., Zhuykov V.Ya., Suchik V.E., Denisyuk S.P., Novoseltsev A.V.* Valve inverters with graded structure. Kiev: Naukova dumka, 1989. 336 p. (Rus)
6. Shcherba A.A., Ivashchenko D.S., Suprunovska N.I. Development of difference equations method for analysis of transient processes in the circuits of electro-discharge systems at stochastic changing of load resistance. *Tekhnichna Elektrodynamika*. 2013. No 3. P. 3–11. (Rus)
7. Shcherba A.A., Suprunovska N.I., Ivashchenko D.S. Modeling of nonlinear resistance of electro-spark load taking in to account its changes during discharge current flowing in the load

and at zero current in it. *Tekhnichna Elektrodynamika*. 2014. No 5. P. 23–25. (Rus)

8. Ivanova O.M., Danylenko M.I., Monastyrsky G.E., Kolomytsev V.I., Koval Y.M., Shcherba A.A., Zaharchenko S.M., Portier R. Investigation of the formation mechanisms for Ti-Ni-Zr-Cu nanopowders fabricated by electrospark Erosion method in cryogenic liquids. *Metallofizika i Noveishie Tekhnologii*. 2009. Vol. 31. No 5. P. 603–614.

9. Monastyrsky G.E., Yakovenko P.A., Kolomytzev V.I., Koval Yu.N., Shcherba A.A., Portier R. Characterization of spark-eroded shape memory alloy powders obtained in cryogenic liquids. *Materials Science and Engineering A*. 2008. Vol. 481-482. Iss. 1-2. P. 643–646.

10. Rezinkina, M., Bydianskaya, E., Shcherba, A. Alteration of brain electrical activity by electromagnetic field. *Environmentalist*. 2007. Vol. 27. No 4. P. 417–422.

**PDF**