

DOI: <https://doi.org/10.15407/techned2016.02.003>

GLOBAL ELECTRIC RLC –CIRCUIT OF A SYSTEM "THE EARTH'S CRUST – ATMOSPHERE – IONOSPHERE" AND ITS RESONANCE PROPERTIES

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	№ 2, 2016 (March/April)
Pages	3 – 10

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Abstract

The global electric RLC-circuit of the Earth is proposed to simulate the coupled electromagnetic processes of extremely low frequency in the Earth's crust, atmosphere and ionosphere. For its computer implementation, taking into account the spatial structure of the spherical elements of the system, the software Matlab/Simulink is used. As shown by study, the circuit is characterized by resonances within frequency range of 0,8–4 Hz, and the first resonance frequency is equal 0,81 Hz. The response of this RLC-circuit to external action harmonic, step function and pulsed voltage sources is examined and significant local overvoltage of the circuit elements under external harmonic action at resonance frequency is revealed. References 11, figures 7, table 1.

Key words: global atmospheric electric circuit, geomagnetic induced currents, resonance, local overvoltage, power system.

Received: 02.12.2015

Accepted: 18.12.2015

Published: 18.03.2016

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Acta Geophysica

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