DOI: https://doi.org/10.15407/techned2018.03.003

CALCULATION OF ELECTRIC FIELD DISTRIBUTION IN THE VICINITY OF POWER TRANSMISSION LINES WITH TOWERS AND UNMANNED AERIAL VEHICLES PRESENCE

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	No 3, 2018 (May/June)
Pages	3 – 9

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Abstract

The results of mathematical modeling of the electric field of overhead power transmission lines (TL) are presented taking into account presence of towers and unmanned aerial vehicles (UAVs) for various cases of the TL lines layout: vertical, horizontal and triangular. Numerical calculations of electric field (EF) were performed using finite integration technique and uniaxial perfectly matched layer. In this case the TL lines under the electrical potential were replaced by linear charges located on their axes. The obtained numerical results for the case of towers and UAV absence were compared with the analytical solutions, which showed coincidence of the EF strength moduli within the range of the assigned accuracy of the numerical calculations– 3%.

The results of calculations are necessary to determine the flight height of UAVs, safe from the point of view of electromagnetic compatibility of the on-board electronics to influence of the TL EF and TL towers. References 13, figures 6.

Key words: electric field; mathematical modeling; overhead power transmission lines; electromagnetic compatibility; unmanned aerial vehicles.

Received: 18.09.2017
Accepted: 19.10.2017
Published: 13.04.2018

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