MODELING THE ELECTRIC FIELD STRENGTH DISTRIBUTION OF OVERHEAD LINES, CONSIDERING THE WIRE SAG

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The regulations in force in Ukraine recommend determining the effective value of the electric field strength of overhead lines, in the cross section of the line, at the point with the maximum wire sag (as a rule, in the middle of the span). In practice, however, it is of direct interest to obtain a complete picture of the distribution of electric field strength at each point of the span.

To solve this problem, a model has been developed that makes it possible to determine the effective value of the electric field strength along the length of the span. The calculation of the effective value of the electric field strength at each point of the span is performed at different values of the wire suspension height above the ground surface. The wire sag height as a function of the span length is specified by means of a parabolic function which, depending on the wire suspension height, the clearance and the coordinate of the point at which the calculation is performed, returns the real suspension height. The effective values of electric field strength are calculated as the sum of complexes of effective values of electric field strength created by each of *k* wires and its mirror image:

$$\dot{E} = \sum_{i=1}^{k} \dot{E}_k^{\text{пр}} + \sum_{i=1}^{k} \dot{E}_k^{\text{дз}}$$

As an example, Fig. 1 shows the distribution of the electric field strength of a 500 kV overhead line both along the line cross section and along the length of the span.

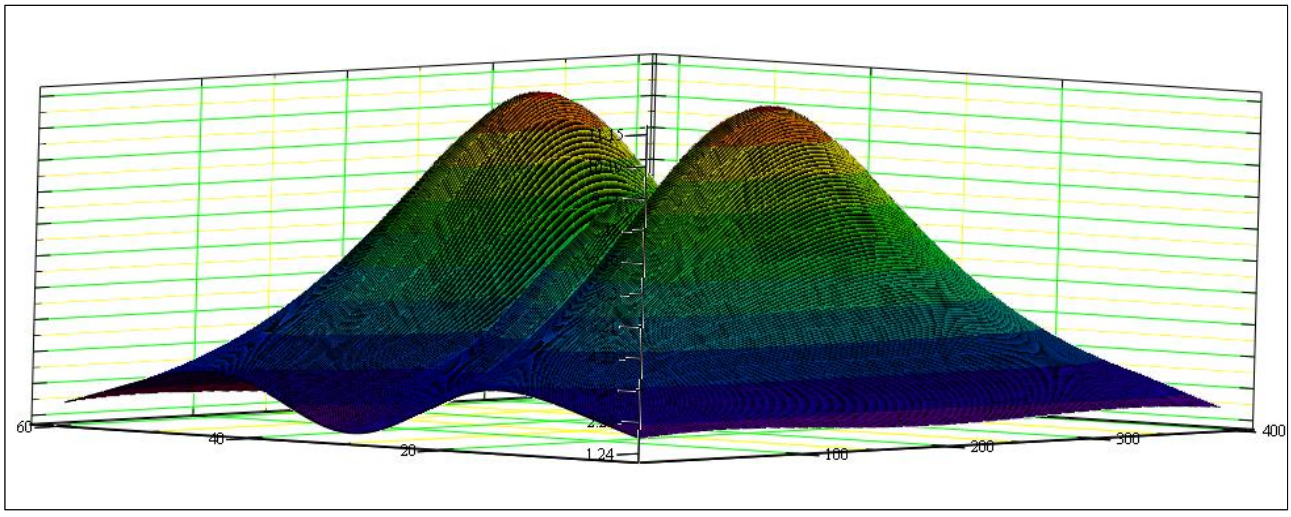

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Figure 1 – Electric field strength distribution of 500 kV overhead lines