

Numerical simulation of laying overhead power lines

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The automation of the construction of new modern power transmission lines and the modification of existing lines requires the development of mathematical methods, algorithms and applications designed to meet the challenges of reducing the construction time and improving the efficiency of the equipment used. The paper analyzes the process of installing overhead lines on the multi-span section of the transmission line, which is carried out with the help of a specialized mounting complex. The method of rolling out wires directly onto the installed supports equipped with special rollers is called "pulling." When analyzing the rolling out procedure, the design diagram of an absolutely flexible inextensible wire is used. The study focuses on the problem of determining the configuration of the wires of overhead power lines in the process of pulling wires on the multi-span section of power transmission lines depending on the pulling force, the problem being solved in a flat setting. The formulation of the problem includes the absence of a priori information about the length of the wire within the span and the assumption that the wire can be rolled through rollers between the spans. The task reduces to the problem of solving a nonlinear boundary value problem for a system of partial differential equations that depend on a parameter. Hence, the nonlinear process is analyzed by the numerical continuation method. The solution obtained is used to create a control system for the power transmission line assembly.

Keywords: numerical continuation method, assembly complex, overhead power lines, simulation

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