

# **Development of mathematical models of choice of the optimum modes and perspective development of system connections of grids of Ukraine**

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## **Results**

The working out essence consists in creation of the specific mathematical apparatus intended for the decision of problems of optimization of operating conditions of a backbone network of the main ExtraHVAC transmission lines taking into account uniform distribution of parameters along length of such lines and estimation of features of wave processes by transfer on them of electric energy. The backlog phenomenon on a phase of instant values of voltage and a current in the end of extended electric mains owing to limitation of speed of distribution of an electromagnetic wave along a transmission line defines essential distortion of results of the decision of optimizing problems of the analysis of operating conditions of a backbone network of the Electric power system of Ukraine with use of traditional mathematical models.

Special mathematical models of a choice of optimum operating conditions and ways of development of the electric systems containing a backbone network of ExtraHVAC transmission lines are created. Mathematical models of definition of structural connectivity of a backbone network of the Electric power system of Ukraine taking into account new ExtraHVAC transmissions are developed. New mathematical models of regime characteristics optimization of a backbone network of the Electric power system of Ukraine with the account of physics of wave processes in ExtraHVAC transmission lines are created. Mathematical models and methods of definition of laws of optimum regulation of regime parameters of a backbone network of the Electric power system of Ukraine taking into account existing technological restrictions are developed. Some problems connected with use of mathematical models of electric mains with distributed parameters at optimum redistribution of streams of jet capacity and optimum regulation of voltage in central points of a ExtraHVAC backbone network is solved.

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