Mathematical problems of power engineering

The discipline "Mathematical problems of power engineering" is designed to adapt the methods of applied mathematics to the peculiarities of solving practical problems of the power engineering using computers. The main attention is paid to the issues of problems' formalization and the use of numerical methods for modeling and optimization of steady-state modes of electric power systems, modeling of transient processes and stability analysis of such systems. Since the functioning of power systems occurs under the influence of many random factors, the apparatus of the theory of probability and mathematical statistics is used to solve a certain group of mathematical problems in the power engineering. The study of the foundations of this apparatus is provided by the discipline "Mathematical problems of power engineering" too. This discipline provides students with the necessary practical mathematical apparatus to carry out engineering research in the field of power engineering.

Automatic control theory

The academic discipline "Automatic control theory" deals with a set of mathematical methods, control principles, the laws of regulation, and technical facilities applicable to power systems to perform certain automatic control functions. The automatic control problem of modern power systems consists in controlling the production, conversion and distribution of electrical energy in both normal and emergency conditions without human intervention. Automatic control is very important to power system control since it provides for normal functioning of power plants and electrical networks so that the whole system is operated in a most reliable and economical manner. That is why, this academic discipline belongs to the main disciplines intended to form the knowledge basis of a student as a future electrical engineer, whose field of activity is modern power systems.