

**MAIN POSTULATES CONCERNING THE OPTIMIZATION OF  
PARAMETERS OF EQUIPMENT FOR NPP POWER UNITS BY  
MATHEMATICAL MODELING METHODS**

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Modern NPP power units are complex technical systems. They include a multitude of interconnected equipment of various technological purposes. Such systems are characterized by many parameters, complex structural and functional relationships of parameters, the presence of limitations for the change of parameters and relationships.

Optimization of parameters and characteristics of the equipment of NPP power units is a complex iterative process.

At the first stage of optimization analytical methods of optimization are some effective, because the value of information about the object of optimization is minimal and the initial dates have a significant error.

At the next stages the value of information about the optimization object is significantly increased. New thermodynamic, constructive, regime factors and necessary technical limitations are account. At the some time the interconnection between the parameters becomes more complex and an analytical solution is possible only with a significant simplification (idealization) of real dependencies.

At the stages of the final optimization researches the most effective method of optimization is the method of simulation modeling.

For effective optimization of parameters of NPP power units the system of interconnected mathematical models is necessary.

For optimization of parameters of NPP power units using a system of mathematical models of the main equipment: the reactor, the steam generator, the turbine unit. The main equipment is advisable divided into characteristic nodes and systems.

The very important task of optimizations is limitations: at a constant electric power of the NPP power unit or at a constant thermal power of the reactor power of the NPP unit. Scientific researches have shown that optimization of parameters of nuclear power units at a constant thermal power of the reactor is advisable.

The depth of detail of the mathematical modeling of all equipment must be based on the principle of equal accuracy: each model must be based on parameters that have the some order of influence on the objective function.

Accounting for the above postulates increases the efficiency of applying mathematical modeling to solve problems of optimizing the parameters of NPP power units.