Power Engineering

Kuzmin V. V., Shevchenko V. V. and Minko A. N. Efficient arrangement of the inactive part of turbo-alternator – a main means to optimization massogabaritnyh parameter of the turbo-alternator 3

The Organized analysis to designs of the inactive part of turbo-alternator, is chosen and research motivated variants efficient connect inactive part of turbo-alternator for the reason optimization his mass-gabarit parameter.

Aero- and Hydromechanics in Power Machines

Yershov S. V. Numerical implementation of boundary conditions at permeable boundaries for the gasdynamics equations 9

The paper suggests a numerical implementation of boundary conditions at permeable boundaries for gasdynamics equations. The main peculiarity of the approach is that the basic and additional relations at the boundary are written in incremental form, not in integral one. Such technique on the one hand increases robustness of the numerical simulation, and on the other hand simplifies boundary conditions treatment for flows of gas with complex state equations.

Heat Transfer in Engineering Constructions

Matsevity Yu. M., Bratuta E. G. and Kharlampidi D. Kh. The analysis of the supercritical cycles of refrigeration machines and heat pumps by means of the generalized dependences..... 13

The generalized dependences for the analysis of energy efficiency of a supercritical R744 cycle refrigeration mechine and heat pumps are developed. The influence of regime parameters of a supercritical cycle and effects of their interaction on the coefficient of performance is examined. The expediency of application of regeneration in the supercritical cycles, and also uses expender is estimated.

Arsenyeva O. P., Demirskyy A. V., Khavin G. L. One mean for optimal plate heat exchanger calculation 23

The analytical correlation of optimal permissible pressure drop for plate heat exchanger design is obtained. That correlation is met of the minimum of discounted value. The design of sugar juice heater before evaporator system is demonstrated high efficiency of this solution.

Slesarenko A. P. and Soroka A. S. Mathematical modeling of floor heatset of buildings in view of maximal heat storage in a heating system 31

On the basis of solving a series of inverse problems of heat conduction the new approach for identification of energy flows in a multilevel heating system is offered at structurally functional management of a level of heating of floor surface of building with the purpose of maintenance of the given heating standards. The problems of identification of databases for energy flows are solved in view of losses of heat through side walls of heating system. There were constructed energy diagrams for systems of heating elements and obtained temperature distributions on a surface of a floor, which characterize a degree of it heatset.

Dynamics and Strength of Machines

Kantor B. Ya, Dolinsky V. M. and Onatsky P. L. static strength of thin-walled vessel with dents under internal pressure 38

In the paper, on base of the finite elements method are organized numerical analyzed for evaluation of static strength and define stress-deformed conditions of the vessel in the region of dents, with provision for geometric and physical nonlinear. The examined process of the forming the dent by means of stamp, unloading and the following loading by allowable internal pressure.

Applied Mathematics

Stoyan Yu. G., **Chugay A. M.** An optimization problem of packing identical circles into a multiply connected region. Part 1. A mathematical model and its characteristics.....44

The paper deals with an optimization problem of packing identical circles into a multiply connected region whose frontier consists of arcs of circles and line segments. The approach that allows to reduce solving the problem to solving a sequence of problems with linear objective functions is suggested. To this end radii of all circles are taken as variables. In order to construct a mathematical model of the problem the concept of Φ-functions is using. Some important characteristics of the mathematical model are considered.

Litvin O. M., Lobanova L. S., Pershina Yu. I., Tkachenko O. V. and Cherniak O. O. Numerical implementation of refacing problem of 3D body.....52

A new method is offered for description of 3D bodies' surfaces which are not allowed for description in cylindrical co-ordinates. Method is applied for mathematic simulation of blade feather surface of aero-engine by known discrete data.

Choporov S. V. and Gomenyuk S. I. The search criterion of singularity points of R-functions ...57

A problem of geometrical modeling of complex solids on the basis of R-functions is described in the article. Authors propose the criterion for finding characteristic points of a geometric structure of objects, that simulated by R-functions.

Nazirov Sh. A. and Nuraliev F. M. Algorithmization of the decision of magneto-elasticity thin bodies problems with the help of the R-functions method 61

In this work the hypotheses magneto-elasticity of thin shells (plates) are given, on which basis mathematical models of motion plates and shells in magnetic field, presented by system of the partial differential equations with corresponding initial-boundary conditions, are building. The problem is solved by joint using of variation methods and the structural R-functions method. The software for carrying out of computing experiment by calculation magneto-elasticity of complex form thin plates (shells) software are developed is developed. Calculating results are given.

Non-traditional Power Engineering

Kanilo P. M. and Kostenko K. V. Analysis of the effectiveness of alternative fuels for vehicles 69

The basic aspects of modern fuel and environmental problems of road transport and the prospects of replacing petroleum fuel to alternatives, including composite energy have been considered. The results of studies of passenger cars in the European urban driving cycle using different fuels and given a complex analysis of the environmental indices of cars, taking into account the total carcinogenicity of exhaust gases have been cited. It is set that the most effective substitute for petroleum motor fuels in vehicles, both from economic and environmental points of view is natural gas, but in the short term - synthetic, including alcohol fuels and hydrogen.

Materials Science in Mechanical Engineering

Matsevity V. M., Kazak I. B., Vakulenko K. V. anf, Polischuk O. F. Some aspects of the heating of metal under cyclic loading 74

It is proposed to use the phenomenon of sharp change in temperature of the samples surface under cyclic loading for an estimation of fatigue damage accumulation in metal. Carried out for steel 40H dependency analysis of temperature from increase amplitude of loading and time of tests has allowed to establish that the heating occurs to increasing speed. It is suggested that such behavior of temperature connected with accumulation of broken interatomic bonds in the metal.