

Aero- and Hydromechanics in Power Machines

- Kovaljov A. S.** Heterogeneous nucleus influence on condensation instability near the expanding nozzle throat for no equilibrium wet steam flow3
Calculation results for heterogeneous nucleus influence on condensation instability near the expanding nozzle throat for no equilibrium wet steam flow are presented. Stabilizing influence of growing heterogeneous nucleus concentration on the flow, which caused the change of regime into the stable flow with the rise of pressure, is shown.

Heat Transfer in Engineering Constructions

- Slesarenko A. P., Kostikov A. O. and Safonov N. O.** The quick recovery of thermal loads by impact spectral functions method.....8
The new methodology for identification of heat flux and heat transfer coefficient on the boundary of the investigated object of complex shapes in real time from the experimental data is proposed. The technique is based on the use of spectral functions of regional impact and a gradual increase the number of regions into which the investigated area is divided and as a consequence the number of parts that make up the boundary where thermal loads are recovered.
- Tsakanyan O. S. and Koshel S. V.** Heat transfer of multichannel water convectors under natural convection20
Heat transfer experimental investigations of multi-channel convectors of various design in the free air flow. The obtained results allow to define the heat output depending on the number of heater convector vertical channels, the number of tubes rows in a horizontal plane and the height of the rear wall. The obtained characteristics is the basis for the design of multi-channel water convectors.

Dynamics and Strength of Machines

- Hasanov F. F.** Modeling of shear crack nucleation in a body, weakening by periodic system of circular holes.....29
A mathematical model of crack nucleation in an isotropic body, weakened by periodic system of circular holes, at the transverse shear was constructed. It is assumed that as the intensity of the external load is increase, in the perforated body cracks nuclear. Solution of the problem of the equilibrium of the perforated body at transverse shear with pre-fracture zones is reduced to the solution of two infinitely algebraic systems and two non-linear singular integral equations with Cauchy kernel. From solutions of these equations are found forces in the zones. The criterion of crack nucleation is formulated with the criterion of limit shear of material bonds.
- Shulzenko N. G., Grishin N. N. and Palkov I. A.** The stress-strain state of the lock joint of the operating blades of the turbine37
The analysis of the stress state of the connection disc of 1st degree cylinder medium-pressure steam turbine blades in the castle. The areas of possible occurrence of fatigue cracks in the castle connection with turbine operation.
- Javorskyj I. M., Yuzefovych R. M., Kravets I. B., Matsko I. Y. and Stetsko I. G.** Information-measuring system for multidimensional vibration diagnostic.....45
The new approach for multidimensional vibration diagnostic based on methods of nonstationary random processes theory and correlation tensor analysis for complex rotating machines diagnostic is proposed. The verification of developed methods on industrial objects of Ukraine and vibration test bench is shown. The portative vibration diagnostic system which utilizes the developed methods is described.

Lisin D. A., Maksymenko-Sheyko K. V. and Sheyko T. I. Mathematical modeling of the automobile bodies with the help of R-functions..... 51

The stage-by-stage modeling of the automobile body by the multiparameter equations with alphabetic parameters for geometrical characteristics and a technique of the surfaces equations of construction with continuous curvature function with the help of R-functions is considered in this work. The work of new high-speed system of the equations of geometrical objects surfaces visualization in 3D is illustrated.

Lytvyn O. O. and Hurdei E. L. Method of creation of operators with the given projections along being crossed straight lines to interpolate $f(x, y)$ in cross points of these straight lines 60

In this article was proposed a method for constructing approximation operator function $f(x, y)$ that interpolates $f(x, y)$ the points of intersection of lines $\Gamma_k, k = 1, 2, \dots, M$ and the projection is along these lines that match the projections of along these lines. Method of constructing operators interpolation functions of 2 variables with given projections investigated for the case of lines that intersect and no three intersect at one point. Were considered examples.

Non-traditional Power Engineering

Chornaya N. A. Improvement of mathematical models of heat and mass transfer processes in hydrogen metal hydride systems 68

Heat and mass transfer processes, especially in the «hydrogen-metal», in metal hydride systems are considered in the article. The creation methods for improve of mathematical model of heat and mass transfer processes in hydrogen metal-hydride systems, which are take into account kinetics of the process and allow more fully shows the characteristics of the process in comparison with existing models. The use of the methods makes it possible to carry out the simulation of the metal-hydride systems and to define a set of design and operating parameters which characterize its overall performance.

High Technology in Mechanical Engineering

Banaszek S. The modeling of defects in the rotor-trains of turbomachinery – simulation-based diagnostics 73

The paper is devoted to the problem of the turbomachinery defects' modeling. The numerical analysis of the proper model of the rotating system and its defect can give the symptoms of the defect. The presented computer software MESWIR is originally invented in the Institute of Fluid-Flow Machinery of PAS (Gdansk, Poland) and it is the effective tool for generation of diagnostic relations. It is based on the non-linear analysis of the rotating systems founded on hydrodynamic slide bearings. It uses a 3D Reynolds equation, FEM and the non-linear equation of motion. The MESWIR software can generate the kinetoststic characteristics of bearings and vibration of the entire system (the shaft and the bearings). It allows a model-based diagnostics of a several classes of defects. A large power turbo-set is taken for example calculations. A dynamic state of the healthy rotor, in the form of vibration of bearings, is presented as a "base case" which is the reference for further analyzes. A two different defects were modeled: the bearing misalignment and the crack of the shaft. The calculated vibratory state of the bearings shows their symptoms in comparison with the base case.

Оригинал-макет подготовлен в редакции журнала «Проблемы машиностроения»
Компьютерная верстка А. О. Костиков
Редактор Н. В. Сивцова

Подп. в печ. 22.09.13. Формат 60×84 1/8. Гарнитура «Таймс».
Бум. офс. Усл. п. л. 10. Тираж 300 экз.
Цена договорная. Заказ №

Издание подготовлено к печати и отпечатано
в типографии ГП «СКТБ» ИПМаш НАН Украины
Украина, 61046, г. Харьков, ул. Академика Филиппова, 9/17
тел. (0572) 95-95-28
Свидетельство: № 29695720 от 18.06.03