

# ANNUAL SCIENTIFIC JOURNAL OF OVIDIUS UNIVERSITY

## MECHANICAL ENGINEERING SERIES

### ANALELE UNIVERSITATII OVIDIUS CONSTANTA – SERIA INGINERIE MECANICA

#### VOLUME V, NUMBER 1, 2003

#### **REGRESSIVE FUNCTION DETERMINATION FOR THE CUTTING FORCE COMPONENTS FOR 41M<sub>o</sub>C11 STEEL TURNING**

LUNGU I., MIHAIESI Gh., ILIE C., *Ovidius University of Constanta, Romania*

**Abstract.** For the optimization of cutting process we must consider the influences of all parameters of cutting conditions. Because of the cutting complexity process, establishing the calculation relations for different parameters, which characterize this process, cannot be made analytically, but with the help of regressive functions only, which are established experimentally.

Because the chip removal workability it is different for each worked out material, for every cutting tool – material couple, we must determine different regressive functions from the exponents and constants point of view, which are used in the calculation relations.

Considering the fact that the cutting forces have a influence over cutting tool wear and consumed energy, it is imperative to establish a relation between tools wears and the parameters of cutting conditions.

#### **APPRECIATION OF PARAMETERS GRAVEL OF TASK'S INTERFERENCES BY THE FINITE ELEMENT METHOD**

CARJALI E., *Ovidius University of Constanta, Romania*

**Abstract.** Task's interference's of the quantitative parameters can be expressed by the study of the points of the removal from the tooth profile (the contact points between the teeth's flanks). The help of finite element method does this study care and depending by the results obtained it operates changes in the technology of the execution, so that the paper below will be exposed.

#### **ULTRASONIC BEHAVIOUR PRODUCED BY LASER RADIATIONÂ**

CARJALI E., *Ovidius University of Constanta, Romania*

**Abstract.** The paper puts in evidence the fact that frequency of elastic waves induced under the action of laser pulse depends on the excitation pulse duration. Also is presented the elastic waves amplitude dependence on frequency and the phenomenon unfold time.

## **METHOD FOR STUDYING OF NITROGEN CONTENT IN Fe BASED PM-MATERIALS AFTER NITRIDING OR CARBONITRIDING**

RUSEVA E.V., *Technical University of Varna, Varna, Bulgaria*

**Abstract.** Recently some papers concerning sinterability and pressability of Fe-based powder (PM-materials) enriched with nitrogen by nitriding have been published. Nitrogen content of these powders depends on the quantity of phases formed and on nitrogen content of the phases. In our papers Fe based powders with given nitrogen content have been described. In this paper some methods of X-ray analysis of the Fe based powders aimed at establishing their total nitrogen content are systematized and developed. The methods can be utilized for the study of nitrogen influence on compressability, sinterability and some other properties of sintered compacts.

## **ATTEMPTS IN THE CFC REPLACEMENT IN EXISTING FOOD INDUSTRY SYSTEMS**

MEMET F., *Constanta Maritime University, Constanta, Romania*

**Abstract.** Concerning the environmental criteria, the substitute for the CFCs should fulfill the requirement of ozone depletion, of low direct global warming potential and a low indirect global warming effect.

This paper makes an analysis of the refrigeration system, in different sectors. For existing systems we recommended HCFC mixtures which can be used as straight replacements of CFCs with performance match or improvement and no system modification, thus minimizing retrofit issues.

## **INTERNATIONAL FRAMEWORK CONCERNING THE CONTROLLED SUBSTANCES**

MEMET F., *Constanta Maritime University, Constanta, Romania*

**Abstract.** The substitution and control of chlorofluorocarbons, hydro chlorofluorocarbons, halons, carbon tetrachloride, 1, 1, 1-trichloroethane, hydrobromofluorocarbons and methyl bromide in refrigerating system is a present day-matter. As everybody knows, the matter has been ruled by Montreal Protocol and the following international directives, aiming the protection of the stratospheric ozone against the aggressiveness of these substances.

As a consequence, a development took place, especially in the developed countries, leading to the application and development of refrigeration and air-conditioning systems using "green refrigeration".

The paper presents the latest developments regarding international regulations on Ozone Depleting Substances; also, a comparison is made concerning their production and consumption.

## **A COMPUTER-AIDED DESIGN/MANUFACTURING PROCEDURE FOR SMALL RADIAL FLOW TURBINE IMPELLERS**

PENEV V.K., *Technical University of Varna, Varna, Bulgaria*

**Abstract.** A technique is described for the analytical representation of the geometry of small flow impellers constructed of radial blade elements. A similar analytical expression is used to describe the hub, shroud and camber line curves. These analytical expressions lend themselves to rapid manipulation enabling designer to specify the impeller passage geometry. The analytical specification gives coordinate specification of the impeller for use with numerically controlled machines.

## **ERROR ANALYSIS FOR INDUSTRIAL ROBOTS**

CHIRCOR M., ZAGAN R., CHITU G., *Ovidius University of Constanta, Romania*

**Abstract.** Calculating the position and orientation of the end effector for an industrial robot is a matter of maximum importance. The accuracy of the computation is also important. In order to determine the accurate position and orientation of the end-effector we must first determine the error of the robot. The values of this errors must be lower than the necessary ones. For a specific robot working in specific conditions we must establish all the sources errors. The next step will consist of introducing these errors into the direct and inverse kinematic model, so that the accuracy of the robot increases. The robot controller can compensate these errors. We can also use this in the process of calibration of the robot.

## **CAD MANAGEMENT ISSUES: NEW FEATURES TO CONTROL 2D-3D MIGRATION PROBLEMS**

POMAZAN V., *Ovidius University of Constanta, Romania*

**Abstract.** This paper provide an overview of main 2D-3D transition problems encountered and the new AutoCAD 2004-based products with an emphasis on how CAD managers should evaluate their benefits.

## **A FEW CONSIDERATIONS ABOUT SHIP MOTIONS WITH SIX DEGREE OF FREEDOM SOLVING WITH SEAWAY PC PROGRAM**

CHITU G.M., ZAGAN R., CHIRCOR M., *Ovidius University of Constanta, Romania*

**Abstract.** The ship is considered to be rigid body floating in a sea. The coordinate systems are presented. The resulting six ship motions in the  $O(xyz)$  system are defined. To get an impression of the behaviour of a specific ship design in a seaway, standard representations of the wave energy distributions are necessary. SEAWAY is a frequency-domain ship motions PC program, based on the strip theory. Experimental results are presented for a container ship.

## MECHANICS OF PROPULSION OF VESSELS BY CABLES

UNSANLAN D., *Institute of Marine Sciences and Technology, Dokuzeylul University, Izmir, Turkey*

**Abstract.** One of the most fundamental ways of ship propulsion, but one that has a very limited usage, is the propulsion of vessels by cables. A cable laid on the bottom of the waterway will be pulled by the vessel from the bow and will be released back to the water from the stern by means of a cable-winch type device. This will reduce the mechanical complexity of the propulsion system, and will eliminate the relatively inefficient hydrodynamic propulsors and related appendages, thus meriting a high propulsive efficiency. Other possible advantages are the increased directional stability, increased ability for crash-stop manoeuvres, being suitable for double-ended ferry configurations, thus reducing the time required for berthing and de-berthing. It is believed that this type of propulsion will find an application in passenger and vehicle transportation across rivers, estuaries, reservoir lakes, and even between the two sides of small bays or across channels separating pieces of land where there is no intervening traffic.

## AUTONOMOUS INVERTER FOR INDUCTION HEATING WITH ENERGY DOSING

TOSHKOV G.<sup>a</sup>, YUDOV D.<sup>a</sup>, PARUSHEV P.<sup>a</sup>, SEYKOV A.<sup>b</sup>, *<sup>a</sup>Technical University of Varna, Varna, Bulgaria, <sup>b</sup>Ena-Varna, Bulgaria*

**Abstract.** The resonant inverters are widely used in designing the modern current sources for induction heating. During the last years resonant inverters with dosing diodes are applied. The paper presents the results of the investigation of resonant inverter with dosing diodes. A Pspice model of semi-bridge resonant inverter with dosing diodes is developed. The main characteristics of the inverter are obtained and conclusions about the quality of the circuit are drawn.

## TITLE MODELLING THE OPERATION OF A SHIP AUTOPILOT WITH THE LABVIEW SOFTWARE SYSTEM

PARUSHEV P.V., STOYANOV S., *Technical University of Varna, Varna, Bulgaria*

**Abstract.** The autopilot model has been developed using the features of the Labview software product.

## A CURRENT REGULATOR IN THE HIGH-VOLTAGE DISCHARGE CIRCUIT

BARUDOV S.T., *Technical University of Varna, Varna, Bulgaria*

**Abstract.** The CO<sub>2</sub> lasers with continuous action and constant-current excitation have voltage-current characteristics in the range of up 15-20 kV, and 50-100 mA. In order to obtain a higher optical power without creating conditions for optical inhomogeneity, mostly due to splitting the plasma column, sectioned active elements are used in cases of large length of the

inter-electrode space. The stability of the parameters of the generated optical radiation depends on the stability of the discharge current. This work is dedicated to the development and investigation of a start-up and regulating unit in the form of a compensation stabilizer with continuous action of the discharge current.

## **APPLICATIONS OF THE PIN DIODES FOR SWITCHES**

GEORGIEVA N.G., *Technical University of Varna, Varna, Bulgaria*

**Abstract.** This paper briefly introduces PIN diodes switches, fundamentals of these switches and some applications of PIN diodes switches.

## **EVOLUTIONS OF PORT MANAGEMENT**

POPESCU V., POPA G., *Ovidius University of Constanta, Romania*

**Abstract.** Today's maritime ports evolution is characterized by the penetration of privatization more and more important into ports, like a trial of efficientisation that is made to resist against the increasing competition. There are many ways that allow the private sector to take part in the public sectors development, management and operation, culminating in outright sale of state assets to the private sector. These methods have been tested in many ports of the world, but there is not a most propitious model of private sectors participation that might be successfully used in any port. This article details a variety of ports management and organizations models, emphasizing the trend of their transformation, in order to adapt the ports to the requirements more and more sophisticated of international economy, world trade and transport, in general.

## **CONSIDERATIONS CONCERNING THE DIAGNOSE OF RELIABILITY**

MILITARU C.<sup>a</sup>, TOPALU A.M.<sup>b</sup>, *<sup>a</sup>Polytechnical University of Bucharest, Romania, <sup>b</sup>Ovidius University of Constanta, Romania*

**Abstract.** In efficient exploiting the elements or the systems, an important fact is reducing the repair and maintenance expenses and also maintaining them in a good functioning condition. Due to the inherent wear and the malfunctions appeared during functioning, the elements modify their structural parameters, affecting the entire system. In order to attenuate this phenomenon, an important part is played by maintenance and repair.

## **CONSIDERATIONS CONCERNING THE RELIABILITY CONTROL**

MILITARU C.<sup>a</sup>, TOPALU A.M.<sup>b</sup>, *<sup>a</sup>Polytechnical University of Bucharest, Romania, <sup>b</sup>Ovidius University of Constanta, Romania*

**Abstract.** Same as control of the lots reception from the quality characteristics point of view, the lots of products reliability control through statistics methods represents, in the basics principals, a tasting of statistics conjunctures. Often, plans of control are made for

certification of the good function of medium time – GFMT, as principal reliability parameters.

## **THE QUALITY MANAGEMENT SYSTEM, NEW ELEMENTS REGARDING THE OPTIMIZATION OF THE FLUX OF DOCUMENTS**

ILIE C., MELNIC L., LUNGU I., *Ovidius University of Constanta, Romania*

**Abstract.** In this paper we present the activity control function of the Quality Management System used like a method of achieving the following objective: control of documents.

The present paper is trying to emphasize one way of control of the flux of documents, easy to be used in any moment of the activity and at any hierarchical level.

This way of controlling the flux of documents is materialize using a new element from the Quality Management System, defined as: Document Control Matrix.

## **PREDICTION OF FINANCIAL DATA STREAMS USING WAVELTS**

ZAGAN R., CHIRCOR M., PERIDE N., *Ovidius University of Constanta, Romania*

**Abstract.** The subject of this paper is to describe the advantage that is offer for modeling and prediction of financial data streams, when is using wavelets networks. The basic principle consist the decomposition of the financial data into scale-related components, and fusion of the forecast at each scale. In the present paper the Discrete Wavelet Transform (DWT) was used to process the exchange rate LEU-USD time series. Furthermore discuss the denoising of the time series data, and we use neural networks to provide predictions.

## **ASPECTS ON HEURISTICS USED FOR OPERATIVE MANAGEMENT OF PRODUCTION**

POSTOACA M.M., *Ministry of Internal Affaires, Romania*

**Abstract.** One of the main challenges now is the preparation of task plans for production resources, these task plans emphasizing both the order of production and utilization rates of each element from the system. The paper present seven usual heuristics applied in production management. Heuristics have been tested on a total number of 500 problems. It have been taken into account problems with 4, 5, 10, 15, and, respectively, 20 processes and 4, 5, 10, 15, 20 machines, the processing times being random variables uniformly distributed in a (0, 10) range.

## **USE OF QUEUES IN OPERATIVE MANAGEMENT FLEXIBLE PRODUCTION**

POSTOACA M.M.<sup>a</sup>, MELNIC L.V.<sup>b</sup>, *<sup>a</sup>Ministry of Internal Affaires, Romania, <sup>b</sup>Ovidius University of Constanta, Romania*

**Abstract.** The perturbation modeling is based on the assumption that service interruptions and maintenance operations are directly related to machines. As long as the perturbation persists, the machine is occupied by a fictive product, so the machine does not produce

anything in that period. In MULTIQ model, any type of space parts needs to be fastening on a certain type of blade. Only two of blades (one for each type of perturbation) need to be defined. Two kinds of analysis have been done: first simulations, taking into account for the same hypothesis on variables as in analytical model, and second type simulation, more close to real case. Certain observations done in flexible departments show that time period between two interruptions follows a Weibull law; on the other hand, the preventive maintenance operations, planned at regular periods, assume that time between two maintenance operations and intervention period are uniformly distributed variables. Finally, the interruptions reparation periods are uniformly distributed, while the execution periods are exponential distributed variables.