

ABSTRACTS OF PAPERS PRESENTED AT INTERNATIONAL CONFERENCES

The abstracts of papers published in this magazine pertain to research projects conducted all over I.R. Iran, including those papers which have been printed previously in reputable scientific publications, and are not limited to the Sharif University of Technology. The Editor would be happy to include abstracts, in future editions, of all scientific papers presented by researchers throughout the country, with a view to keeping the academia and professionals informed about research activities carried out by Iranian scientists.

ON THE DYNAMIC RESPONSE OF BEAM ON TENSIONLESS ELASTIC FOUNDATION*

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ABSTRACT

This article extends a procedure that has been used to discretize a static physical system following the assumption that a continuous flexible beam can be replaced by a system of rigid bars and joints which resist relative rotation of the attached bars. This procedure is called "discrete element response of beams". The object of this paper is to present and formulate a new, simple, practical and inexpensive approximate technique for determining the response of beams with different boundary conditions, carrying

a moving mass on a tensionless elastic foundation, which usually ends in very complicated nonlinear differential equations.

INVESTIGATION OF THE SOURCE AND LEVEL OF POLLUTION ON THE SOUTHERN SHORES OF THE CASPIAN SEA**

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** Presented at 8th International Conference on Protection and Management of Lakes, Copenhagen, Denmark (May 17-21, 1999).

ABSTRACT

The Caspian Sea with salty water is the largest inland lake of the world and, due to its size and saltiness of its water, is recognized as sea. This large water resource with a shore line of approximately 1000 km on the Iranian side, is a rich source of food, minerals and petroleum, and plays an ever increasing role in the livelihood of its circum.

Urban developments, industrial and agricultural activities on shore and exploitation of hydrocarbon reserves offshore are major threats of pollution to the near shores of the sea.

To investigate the present level of pollution on the Iranian shores of the Caspian, a systematic study was launched in Guilan and Mazandaran two large provinces of Iran which face the sea.

The study is comprised of the identification of major rivers in those provinces which supply water to the sea, sampling and analysing of the pollution carried by the rivers to the sea, and analysis of the water samples taken near shore at six different sea fronts in the provinces.

Results of the analyses and their correlation with existing models show that, fortunately, the level of pollution near the shores are at present below the maximum self-cleaning capability level of the sea.

LPM EFFECT ON MUON CONTENT OF AIR SHOWERS*

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ABSTRACT

The Landau-Pomeranchuk-Migdal (LPM) effect, recently verified for electrons in accurate measurements at SLAC, has been studied for muon pair production by extremely high energy (EHE) photons in dense media. It is found that the suppression of the

cross sections for muon pair production, relative to the cross section given by Bethe-Heitler theory, is much less than that of electron pair production. The ratio of the two cross sections shows an abrupt enhancement above a characteristic threshold energy for each medium. It is suggested that this enhancement may resolve the anomalous muon production puzzle in extensive air showers (EAS) and underground experiments. The suppression of the electron pair production may be responsible for the inability of EAS arrays in detecting gamma ray point sources at their present sensitivity levels. The study suggests that more muons will be observed from the direction of a EHE gamma ray source when the source is near horizon.

STUDY EFFECTS OF CUTTING CONDITIONS ON MECHANICAL PROPERTIES OF MACHINED LAYER USING FEM**

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ABSTRACT

The finite element method is used to model mechanical properties of machined layer such as residual stress, hardness and surface texture in orthogonal metal cutting with continuous chip formation. Node separation criterion is based on a critical distance from the tool tip. The material model used is elastic-plastic with linear work hardening together with von-Mises yield criterion. In this analysis two distinct friction regions (sticking and sliding) are used on the tool-chip interface. The effects of cutting conditions such as depth of cut, rake angle, clearance angle, feed and friction are discussed. The results of this investigation can be used in optimization of cutting conditions, design and manufacturing of tool and workpiece holding systems.

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IN PLANE DEFORMATION OF A COMPOSITE SHEET WITH NON-UNIFORM REINFORCEMENT*

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ABSTRACT

The analysis of in-plane deformation of a rectangular sheet is accomplished in this study. The sheet is a crossply laminate, which is comprised of two layers. Each layer is made up of an isotropic matrix reinforced by orthotropic fibers, which are distributed with variable spacing in one direction parallel to the edges. Perfect bonding is assumed between layers. The rule of mixtures is used to determine the in-plane elasticity coefficients, which vary throughout the sheet. The Navier equations for the sheet under the static condition yield to two partial differential equations with variable coefficients for displacement components. Employing the "Different Quadrature" procedure, these equations subjected to various boundary conditions are solved and the displacement and stress fields are calculated. The boundary conditions may be displacement and/or traction. In order to verify the validity of the method of solution, the results for a lamina are compared with those in the literature and close agreement is observed.

A NEW PLASMA WAVE MICRO-OPTICAL MODULATOR / SWITCH**

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ABSTRACT

Feasibility of a new integrated waveguide amplitude modulator/switch in the visible and IR spectrum, based

on the absorption of light due to the linear interaction of the incident laser and a two-dimensional plasma layer, is demonstrated. Plasma layers are generated via the Muller effect at the waveguide's interfaces. Carrier mobility is increased in the interfaces by inserting a few monolayers of a high-mobility material in the interface. A plasma wave is excited in the two dimensional gas, when it is illuminated by electromagnetic radiation. Thus, due to the energy transfer from the electromagnetic wave to the plasma wave, the output light intensity can be controlled.

RELIABILITY ANALYSIS OF DYNAMIC STRUCTURES***

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ABSTRACT

In this paper the concepts to compute reliabilities for stationary and ergodic conditions in the presence of time-invariant non-ergodic parameters will first be reviewed. Focus will be on numerical techniques like FORM and numerical integration. The effect of correlation between the environmental processes within a sea state is studied, as opposed to between sea state correlation that turns out to be unimportant.

The system reliability of jack-up structures is discussed using a combination of dynamic simulation of a stick model and static analysis of a detailed jack-up model. First, the dynamic time domain

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*** Presented at 3rd International Conference on Coasts, Ports, Marine structures, (COMAS'98) Tehran, Iran (Dec. 13-15, 1998).

simulation, the quasi-static time-domain simulation and the design wave analysis are applied for different sea-states using a stick structural model. In the second phase, the concepts *Dynamic Amplification Factors (DAF)* and *Calibration Factors (CF)* are introduced for extreme responses of a detailed structural model of jack-up structure. To utilize the analogical quantities for stick and detailed structural models, the design wave responses of the detailed structural model are linked with the extreme responses and the probabilistic models of dynamic effects using a stick structural model.

PERFORMANCE AND CAPACITY EVALUATIONS OF DECT, PACS, AND PHS STANDARDS FOR WIRELESS LOCAL LOOP APPLICATIONS*

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ABSTRACT

In this paper, performance and capacity of the three standards for Wireless Local Loop (WLL) applications have been investigated, both qualitatively and quantitatively. The qualitative evaluation consists of detailed comparison of parameters of each standard and their relevance in WLL applications. In the quantitative analysis, detailed simulations have been performed covering diversified sets of conditions. The results of both types of analysis are presented. A major conclusion is that all three standards provide satisfactory performance for WLL applications. For low traffic environments, PACS, which can employ larger cells, perform better than the other two standards. In suburban areas, where, in addition to coverage capabilities capacity is an issue, DECT has better performance. For high traffic density urban areas with great capacity requirements, the three standards all have good performance.

MOBILE SATELLITE PROPAGATION CHANNEL PART I - A COMPARATIVE EVALUATION OF CURRENT MODELS**

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ABSTRACT

In this paper, major statistical propagation models of the mobile satellite channel are presented and their performances are evaluated by means of computer simulation and comparison with available empirical data. The comparison shows that Lutz provides the best fit to empirical data. After that, Nakagami, Corazza, Loo and Norton are the better performance models, in the given order. In a companion paper, a flexible model of the channel, which is phenomenologically reasonable, is proposed and its performance is compared with other available major channel models.

MOBILE SATELLITE PROPAGATION CHANNEL PART II - A NEW MODEL AND ITS PERFORMANCE***

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ABSTRACT

In a companion paper (Mobile Satellite Propagation Channel, Part I-A Comparative Evaluation of Current Models) several models of the mobile satellite propagation channel were reviewed and their performances were compared by means of computer simulation and comparison with available empirical data. In this paper, a new model, which is a combination of N (Rice) and Q distributions, is proposed and compared with the other mobile satellite channel models. A major conclusion is that this model has superior performance compared to other well-known models. Principles of the model and its capability in fitting empirical data are reported.

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