

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
СУМСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ  
ФАКУЛЬТЕТ ІНОЗЕМНОЇ ФІЛОЛОГІЇ  
ТА СОЦІАЛЬНИХ КОМУНІКАЦІЙ**



# **СОЦІАЛЬНО-ГУМАНІТАРНІ АСПЕКТИ РОЗВИТКУ СУЧАСНОГО СУСПІЛЬСТВА**

**МАТЕРІАЛИ ВСЕУКРАЇНСЬКОЇ НАУКОВОЇ КОНФЕРЕНЦІЇ ВИКЛАДАЧІВ,  
АСПІРАНТІВ, СПІВРОБІТНИКІВ ТА СТУДЕНТІВ**

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The purpose of the paper is to make the mechanism of photochromism more exact, to investigate the conformational transformations of the spiropyran molecule and the process of changing its hybridization.

To achieve the purpose of the paper the following tasks have been performed:

- to discover the rotamers of open-ring form of spiropyran molecule;
- to investigate the transformation route between two states of the spiropyran.

## **INTERACTION OF STATIONARY SH-WAVES WITH CURVILINEAR CRACKS IN THE SEMI-INFINITE BODIES**

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Modern constructions and buildings work not only in the multiple static and cyclic terms, but also in the dynamic terms. It is well known that during the dynamic loading of bodies that have connections, cracks and other technical or structural faults, the probability of the material destruction is growing. To make an exact mathematical description of the wave field in bodies with defects is very difficult. For rating the limited state of such bodies, the consideration of model problems is needed. As a result the development of methods of solution, dynamic tasks for all-around infinite and semi-infinite bodies with cracks and connections of the elasticity theory, is urgent as well as their exact results.

In fact a crack, as a rule, has not got a straight form and, as the researches showed, the degree of the curve influences greatly on the size and character of changes of the stress intensity factor. Different problems appear during the solution of dynamic tasks dealing with curvilinear cracks.

The goal of the work is to develop the method of task solution of the elasticity theory for semi-infinite bodies with the curvilinear incision system or intercalation. The common approach to calculate the stationary dynamic problem of the theory of elasticity for semi-infinite medium with

the curvilinear incisions or thin solid plugs was further investigated. The study showed that the algorithm has a high speed of the degree of convergence. The accuracy of calculations up to  $10^{-10}$  was made at 50 points of the collocation of every circuit. The convergence of the algorithm doesn't depend on the number of cracks. In the diffraction problem SH-waves on the system of solid plugs parallel algorithms allow to reduce time of the calculation and to analyze the characteristics of the wave field in details.

The combination of the method of integral equations that declines the problem dimension, and saves the calculations time due to parallelizing of the calculating procedures leads to the increase of the efficiency of the suggested algorithm.

## **INCREASING EFFICIENCY OF MACHINING HIGH-PRECISION HOLES WITH NONCONTINUOUS SURFACES**

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This paper is about a center hole with noncontinuous surface of a centrifugal pump impeller. The main subject is deviation of cylindrical shape of an impeller center hole and its concentricity to sealing surfaces. The purpose is finding a logarithm of getting precise cylindrical shape of the hole.

The research is connected with detecting defects that occur while rotor assembling, moreover the focus must be made on additional hole elements that an impeller may be constructed of. The approach to avoid this is the surface hardening of a shaft or electrical-spark alloying of an impeller hole.

As world's companies dealing with vibration characteristics control in atomic aggregates like IAEA are increasing the requisition in this field, the technology of their manufacturing has to be improved.

The analysis and monitoring of local pump manufacturing shows quite old approaches, technologies and fixtures that stand away from modern analogs. After analysis of the existing processing techniques and the experiments made an idea to combine the positive properties and eliminate the disadvantages of honing and rubbing was suggested. That is why the