СОЦІАЛЬНО-ГУМАНІТАРНІ АСПЕКТИ РОЗВИТКУ СУЧАСНОГО СУСПІЛЬСТВА

МАТЕРІАЛИ ВСЕУКРАЇНСЬКОЇ НАУКОВОЇ КОНФЕРЕНЦІЇ ВИКЛАДАЧІВ, АСПІРАНТІВ, СПІВРОБІТНИКІВ ТА СТУДЕНТІВ

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the location of the organizational rules of the event, and finishing with the rewarding of the winners. Financial support is provided through tournament fees (from 80 to 150 UAH.), which are payed by competitors and in rare cases by sponsors.

Significant progress in the development of veteran sports can be achieved only if it has a reliable social and legal support, the implementation of which should be undertaken by the state. To do this, in our opinion, the following measures are necessary:

- the development and the implementation of the strategy, as well as the regional programs supporting sport veterans;

- the development of the infrastructure, the strengthening of the material and technical base, the development of the schedule of the veteran sport competitions;

- the development and the implementation of research programs and the system of training and retraining, the improvement of the regulatory framework of veteran sports;

- the organization of complex medical, methodical, consulting, insurance, welfare services for veteran athletes;

- the coverage of veteran sports movement in mass media and telecommunications.

In conclusion it should be noted that this issue affects not only the veteran movement in badminton, but the whole veteran sport. The further research in this area will focus on the study of the enabling environment for the implementation of creative and professional potential of athletes in veteran badminton.

NUMERICAL ANALYSIS OF MULTI-CRACK LARGE-SCALE PLANE PROBLEMS WITH ADAPTIVE CROSS APPROXIMATION AND HIERARCHICAL MATRICES

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The problem of interaction of large number of cracks in a plate is considered by the method of singular integral equations (SIE). The corresponding system of SIE is solved by using Gauss–Chebyshev quadratures, which results in a large system of linear algebraic equations. The solution of the latter employs the adaptive cross approximation (ACA) technique that has not previously been applied for studying multi-crack large-scale plane problems. Therefore, several benchmarks problems with

large number of cracks modelling periodical arrangements have been tested to investigate performance of the method; these include arrays of collinear cracks, parallel cracks, and double network of parallel cracks. Comparisons with analytical and numerical periodical solutions available for the mentioned cases reveal high accuracy and fast performance of the method. It is also applied for studying effective characteristics of bodies with up to 20,000 cracks and for accurate modelling of interaction of a macrocrack with thousands of microcracks.

This study is aimed at the development of fast, accurate and convenient methods for stress analysis of solids with substantial number of random or oriented cracks. Investigation of collective behaviour of cracks in solids is important in many applications, such as determination of effective deformation characteristics of highly cracked materials or rocks, analysis of fracture accumulation prior to propagation, etc. Although numerical methods are well developed for crack problems the account for crack interaction turns out to be a challenging problem of numerical analysis when the number of cracks is large.

Some computing characteristics showing advantages of the ACA solver for the problems involving large number of cracks were summarised. It is evident that both the CPU time and storage requirement grows linearly with respect to the number of unknowns in SLAE. The approach has been verified against analytical solutions for periodical crack arrangements. The results obtained for the fracture characteristics indicate that these agree with those found analytically, which confirms that the method is capable to handle efficiently multi-crack large-scale plane problems.

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STRUCTURE, PHYSICAL AND MECHANICAL PROPERTIES OF THE NITRIDE COATINGS BASED ON   Hf, V, Ta, DEPOSITED BY MAGNETRON SPUTTERING

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In recent years we have seen increased scientific interest in combinations of transition metals that improve the physico-mechanical and structural properties of coatings. Such elements as: Hf, V, Ta - steel are considered as potential candidates. Due to promising mechanical properties and resistance to high temperatures, nitride compounds of Hf, V, Ta are