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SEPARATION IMPACT AND CAVITATIONAL BRAKING OF THE CYLINDER UNDER THE FREE SURFACE OF HEAVY LIQUID

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The two-dimensional problem of hydrodynamic impact and the subsequent braking of a solid body in ideal and incompressible liquid is investigated. Feature of this problem is that the impact of the cylinder which is completely shipped in liquid leads to a separation of particles of liquid from its surface and to formation of the growing attached cavity behind a body. Besides after impact there can be additional cavitation zones caused by the law of movement of the cylinder and physical parameters of a problem. For determination of new cavitation zones the special problem with unilateral restrictions, similar to a classical problem about impact with a separation is formulated. As zones of a separation are in advance unknown, this problem is nonlinear and belongs to the class of problem with free borders. The special iterative method reducing an initial nonlinear problem to the consecutive solution of linear regional problems with the fixed separation points is applied to finding of her approximate decision. The last problems are solved in number, using a finite-element method. As a specific example the problem for the elliptic cylinder is considered. It is shown that dimensionless acceleration of the cylinder has significant effect on an arrangement of additional zones of a separation and their connectivity. The offered mathematical model can be used for the solution of practical problems of ship hydrodynamics.

Keywords: *ideal incompressible liquid, cavitation braking, asymptotics, free border, cavity, small times, Froude's number, cavitation number, additional cavitation zones.*

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ON THE REVERSIBILITY OF LINEAR CONJUGATION OPERATORS

WITH POINTWISE SWITCHING COEFFICIENTS IN COUNTABLY NORMED SPACES OF SMOOTH FUNCTIONS

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In countably normed space of smooth functions with values in a Banach space, we consider the operator interface with linear pointwise switching coefficients. This statement is a generalization of the classical operator Riemann boundary value problem. Development of the theory of Riemann operator and related operators is reflected in the well-known monographs by F.D. Gakhov, N.I. Muskhelishvili, I.N. Vekua, M.G. Kreyn, I.Ts. Gohberg, N.Y. Krupnik, I.B. Simonenko, S. Presdorf, A.P. Soldatov and others. Despite this abundance of publications, the Riemann problem with a degenerate coefficients have been studied insufficiently. In particular, there are no criteria of reversibility and construction of inverse operators in the countably normed space, even in the simplest cases. The paper used the method of studying the operator proposed I.B. Simonenko whereby Noether (of invertibility), the operator of Riemann is equivalent to a factorization of its coefficients. The latter is determined by the space in which the operator is considered and class factors. In this regard, the work is introduced and studied the concept of smooth singular factorization of functions with values in a commutative Banach algebras. In addition, the concept of mutual simplicity of functions with values in Banach algebras. Give a description of these concepts in terms of the behavior of the Gelfand transformation. Criteria of of invertibility, and points back to the operator to operator construction of linear conjugation.

Keywords: operator, line, pair, degenerate, factorization, invertibility, criterion, construction.

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CLASSIFICATION OF A PROGRAMMING LOOPS WITH ONE ASSIGNMENT STATEMENT

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To use the potential of parallel architectures one should apply parallelizing transformations to serial programs. When program is being parallelized most of attention is focused on programming loops. They are small code fragments, which demand a huge amount of computations. Some loops are well executed in parallel on a single architecture and at the same time be suitable only for sequential execution on another. L. Lamport and M. Wolfe described the methods classifications of loops parallel execution earlier. It should be noted that the main types of parallel architectures are SIMD and MIMD. A classification of programming loops, which is based on the dependence graph, is proposed in this paper. The vertices of this graph are the occurrences of variables and the edges connect two vertices in the case of information dependence between the respective occurrences are exist. Further, a match of these classes to known types of loops parallel executions is described also. Some classes correspond to recurrent loops, which can be parallelized using special auxiliary algorithms. The resulting classification can be used, for example, when you create a parallelizing compilers.

Keywords: parallel computations, loop distribution, dependence graph.

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