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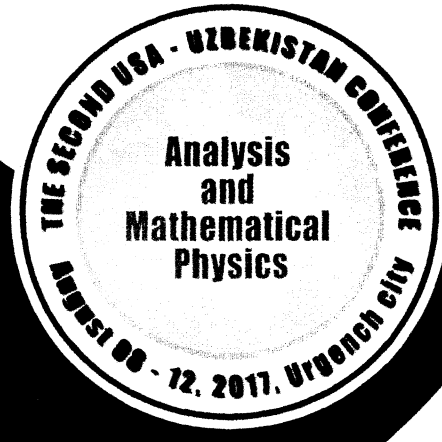
THE SECOND USA - UZBEKISTAN CONFERENCE ON ANALYSIS AND MATHEMATICAL PHYSICS



ABSTRACTS

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VISCOUS FLUIDS IN GENERAL RELATIVITY

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We consider the problem of describing relativistic viscous fluids. More specifically, we study Einstein's equations coupled to a relativistic version of the Navier-Stokes equations. After motivating the problem and reviewing its history, we present recent results about well-posedness and causality of the equations of motion. If time allows, applications will be briefly discussed.

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THE MATHEMATICAL MODEL OF THE CONTACT OF THE FACES OF THE INTERFACIAL CRACK OUTCOMING FROM THE ANGULAR POINT OF THE BROKEN INTERFACE

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The model of the interfacial crack outcoming from the angular point of the broken interface of two different homogeneous isotropic materials has been developed. The model assumes the existence of a near the tip of the crack small-scale contact region of the faces interacting according to the law of dry friction [1]. Owing to the small sizes of the contact zone the condition on the infinity as a demand of the possibility of sewing together the sought solution with the asymptotic solution near the crack tip of the analogous problem about an interfacial crack without contact of faces was formulated. The solution of the suitable static boundary-value problem of the theory of elasticity under the conditions of plane deformation is found by using the Wiener Hopf method [2]. The equations for the determination of the length of the contact zone and stress singularity index near the crack tip and an expression for the contact stress were obtained. The numerical analysis of the dependence of the contact zone length and stress singularity index on the external load configuration, friction and elastic characteristics of the joined materials was made. The fact that the length of the contact zone decreases impetuously under the normal component of the load increases or the moduli of elasticity of the joined materials become closer was discovered. At the same time, its dependence on the friction coefficient is less pronounced: with the enhancement of the friction of the faces, the length of the contact zone increases slightly. We have established that the contact of the faces eliminates the physically uncorrected spatial oscillation of the displacements predicted by the classic theory of the interfacial cracks with the exception of a narrow enough interval of the interfacial angle.

REFERENCES

1. *Comninou, M.* The Interface crack. Transactions of the ASME. Journal of Applied Mechanics, Vol. 44, 631-636 (1977).
2. *Noble, B.* Methods Based on the WienerHopf Technique. New York (1988).

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