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TO SOME THERMO–DYNAMICAL NONLINEAR SPATIAL PROBLEMS OF PIEZO–PORO–ELASTICITY FOR BINARY MIXTURE

The main objective of this report is construction and justification of the new mathematical models for anisotropic nonhomogeneous visco-poro-elastic media and their application in case of thin-walled structures with variable thickness in thermodynamic and stationary nonlinear problems of determination of stress-strain state. Particularly it will be studied the case, when thin-walled structure is poro-piezo-electric and electrically conductive elastic binary mixture. For thermo-dymanical and stationary cases by using and developing discrete projective methods will be constructed computational models and on their basis may be created effective program systems. For dynamic problems will be considered the finite and semi-finite time-depending cases. When the interval is finite, the third and fourth order accuracy new schemes of Rogava, Gegechkori and Tsiklauri for thermo-poro-elastic structures will be used. In the semi-finite case using Laguerre polynomial system we consrtuct a new stable implicit and explicit schemes, which are convergent unlike the classical method for relatively non -smooth classes of functions. Spatial mathematical models considered here generalize the well-known theories, e.g. contemporary theories of Biot, Frenkel, Novojilov, Naghdi, Antman. On the basis of the above-mentioned spatial mathematical models there are constructed a system of nonlinear equations of von Karman-Mindlin-Reissner type for anisotropic nonhomogeneous piezo-poro-elastic thin-walled structures with variable thickness and justified their "Physical Soundness"(in Truesdell-Ciarlet sense). This question is yet an unsolved problem even in the case of von Karman equations' system for thin isotropic homogeneous plate with a constant thickness. Finally there will be reported results respect V-elliptic of some above considering linear stationary systems of differential equations, in particular, for systems of equations corresponding to spatial anisotropic theory of elasticity.