Carrying out homogenization of a non-stationary model of the linear theory of elasticity taking into account the formalism of the generalized derivative

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The problem of finding effective transfer coefficients included in the averaged equations and reflecting the microstructure of the system when studying non-stationary phenomena is poorly understood in the literature [1] and is relevant. The relevance is associated with the description of a heterogeneous material obtained by additive technology of controlled laser action and having a complex microstructure formed during its creation [2]. To solve the problem, it is necessary to take into account the collective influence of dynamically changing phases on the propagating field under study in a heterogeneous medium, which is associated with a description of the configuration of moving internal boundaries. The work presents the derivation of a mathematical model of the nonstationary linear theory of elasticity of a heterogeneous medium, using the formalism of Green's functions, Fourier transforms and generalized derivative [3], the singular component of which taking into account the configuration of the internal boundaries of the heterogeneous medium. The resulting equations with asymptotic cases are analyzed. The work is supported by the Russian Science Foundation (project No. 24-19-00595).

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