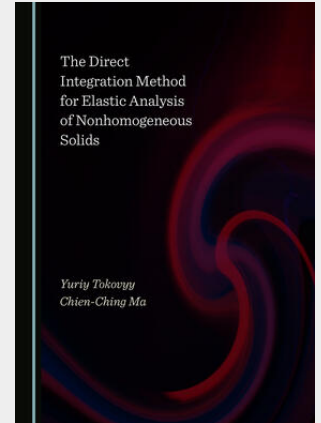


Tokovyy / Ma

The Direct Integration Method for Elastic Analysis of Nonhomogeneous Solids

The direct integration method (a general approach to analysis for boundary value problems of mathematical physics with no implications for the potential functions of higher differential order) is presented in this book as a potential tool for the analysis of the elastic response of arbitrarily nonhomogeneous solids to thermal and force loadings. This method rests upon the correct integration of the local equilibrium equations, which results in an explicit relationship between the stress-tensor components and fundamental integral conditions of equilibrium for individual stresses, which can serve to assure the correctness of the solution and provide a simple verification of computational results. Making use of these relationships and conditions, which are irrespective of the material properties, allows for the reduction of the original elasticity and thermoelasticity problems for nonhomogeneous materials to integral equations of a second kind which implies the solution in a closed form. This feature makes the method efficient for the analysis of arbitrarily nonhomogeneous materials, among which the functionally graded materials are of particular interest for both academia and industry.



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